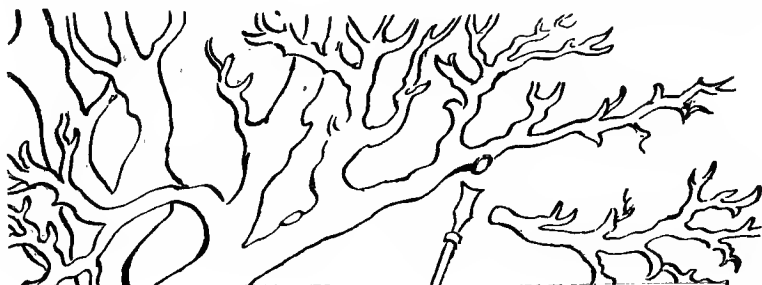


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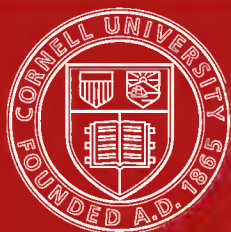
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The book of ensilage; or, The new dispens



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Yours Respectfully
John M. Bailey

THE BOOK OF ENSILAGE;

OR, THE

NEW DISPENSATION FOR FARMERS.

EXPERIENCE WITH "ENSILAGE" AT "WINNING FARM."

HOW TO PRODUCE MILK FOR ONE CENT PER QUART; BUTTER
FOR TEN CENTS PER POUND; BEEF FOR FOUR CENTS
PER POUND; MUTTON FOR NOTHING IF WOOL
IS THIRTY CENTS PER POUND.

BY

JOHN M. BAILEY,

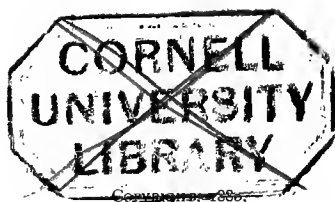
PROPRIETOR OF "WINNING FARM," BILLERICA, MASSACHUSETTS, AND "VIRGINIA STOCK
FARM," SUSSEX COUNTY, VIRGINIA.

"I beg to express my gratitude to you for the noble efforts you are making in behalf of the cause of agricultural science. Ensilage is to prove a great blessing to the world." — MARSHALL P. WILDER.

"A work of incalculable importance to American farmers." — LEVI STOCKBRIDGE, *President Massachusetts Agricultural College.*

BILLERICA, MASS.:
PUBLISHED BY THE AUTHOR.

1880.



By JOHN M. BAILEY.

STEREOTYPED AND PRINTED BY
MILLS, KNIGHT, & Co., 115 CONGRESS STREET, BOSTON.

INTRODUCTION.

To the farmers of America, I beg leave to dedicate this book. It is but a plain recital of what I have accomplished at "Winning Farm," by carefully gleaning every thing I have been able to procure bearing upon the question of Ensilage.

I do not claim the credit of originating the system of Ensilage. That, in a far greater degree than to any other man, belongs to M. Auguste Goffart, a distinguished member of the "Central Agricultural Society of France," and "Chevalier de la Legion d'Honneur," who spent years in experimenting before success final and absolute crowned his efforts.

The following letter would seem to show that the claim for *originality* can hardly be given even to the eminent French gentleman who has done so much to bring the system into general use in Europe.

DR. JNO. M. BAILEY.

HOUSTON, TEX., 3d May, 1880.

Dear Sir,— . . . It may perhaps interest you to know, that, in all probability, this idea of the Silo is by no means European, nor even Eastern, in its discovery and origin. I have for years known—having been so informed by Mexicans themselves, and others who have travelled through the rural districts of Mexico—that many of the farmers of that country preserve their grain, both green and matured, in underground cisterns; the reason assigned being that the ripe grain was thus protected from the attacks of the weevil, whilst the green corn kept well, and was considered better for being a little fermented. So that it becomes almost a certainty that the

French, during their recent occupation of Mexico, seized upon the idea, and, taking it with them to France, have only demonstrated its great practical utility, &c., just as they did in the case of the artesian well, about which so much false history prevails.

Yours truly,

D. D. FIQUET.

I am also informed that some of the earliest Latin writers speak of Silos in the ground, wherein the ancient Romans used to preserve fruits, grain, and forage in its green state, by subjecting them to pressure; so that, after all, the *System of Ensilage* is not so much a new dispensation as one of the "lost arts," which, after the lapse of centuries, has just been re-discovered, improved, and is destined to be the means which shall produce a revolution in modern agriculture.

Probably the idea was carried to Mexico by some learned Spanish monk or priest who had an agricultural turn of mind, soon after the subjugation of Aztecs by the Spanish adventurers who overran and conquered not only Mexico, but nearly all of the American Continent south of it.

I have but put into practice in America that which M. Goffart had demonstrated was practical in France.

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WHAT IS A SILO, AND WHAT IS ENSILAGE ?

This is what the farmers want to know when the "*New Dispensation*, or system of *Ensilage*," is presented to their attention.

A SILO is a cistern or vat, air and water tight on the bottom and sides, with an open top, constructed of masonry or concrete. It may be square, rectangular, round or oval in shape, with perpendicular sides, used to store in their green state forage-crops, such as corn, sorgho, rye, oats, millet, Hungarian grass, clover, and all the grasses. This forage is cut and taken directly from the field, run through a cutter which cuts it into pieces less than half an inch in length, and trampled down solidly in the SILO, and subjected to heavy and continuous pressure.

The structure is the SILO, which may be above ground, or partly or entirely below the surface of the ground. The fodder preserved in SILOS is ENSILAGE.

THE BOOK OF ENSILAGE.

ACCOUNT OF THE "WINNING-FARM" SILOS.

CHAPTER I.

DISADVANTAGES OF THE SYSTEM OF CURING FORAGE BY DESICCATION.

THE great obstacle to raising stock at a profit has always been the high cost of all kinds of fodder for winter feeding. Especially has this been the case in the eastern part of the New England and Middle States. The lowest cost at which a cow can be kept in Eastern Massachusetts is twenty-two cents per day for feed, allowing nothing for care except the manure. This makes the yearly cost of keeping a cow to be at least \$80.30. Many of my fellow farmers who raise milk inform me that it costs them twenty-six cents per day, which raises the cost to \$94.90 per year. To meet the lowest sum \$80.30, at the highest price at which milk has been sold in Eastern Massachusetts during the past few years, viz., twenty-five cents per can of $8\frac{1}{2}$ quarts, each cow would have to yield $321\frac{1}{2}$ cans, or 2,730 quarts, — about 5,500 pounds.

"It goes without saying," that there is not one herd of cows in fifty which averages 5,000 pounds of milk per

head yearly. While this is so, that ninety-eight per cent of the cows yield less value in milk than it costs to feed them, still as a choice of evils farmers are obliged to keep them rather than sell the provender they consume, though it would bring more money than the milk. By gratuitously incorporating a large amount of labor into the milk, they are enabled to keep up the fertility of their farms, while on the other hand were they to sell their forage they would soon impoverish their land.

Paradoxical as it may seem, the only way the majority of farmers near our large cities can make (?) any money is, and has been, to sell milk at less than it cost to produce it! This is a very unsatisfactory condition of affairs.

For several years I have been anxiously looking for science to show us — agricultural laymen — the way out of the wilderness into the promised land, where crops could be grown at a profit *without* the farmer's labor being thrown in as straw — *quantum sufficit* — is when figuring up the cost of wintering stock in the West.

Analyses of the soil at one time promised to bring about a great change in agriculture, by showing us just what the soil lacked to produce bountiful crops of whatever we wish to raise. This proved an *ignis fatuus*, — for nearly all soils were found to contain when chemically analyzed every thing required to produce scores of bountiful crops of almost every thing.

The trouble was, that while the elements of fertility were there *chemically*, they were not there in such a form as the growing plant could avail itself of.

The next great panacea was to analyze the crop which it was proposed to raise, and apply to the soil the various elements found in the crop, principally nitrogen, phos-

phoric acid, and potash. The trouble with this is, that no one can tell except by a series of careful experiments whether one, two, or all three of these elements must be applied to the land in order to raise a satisfactory crop. Having ascertained that a certain crop can be raised upon a certain piece of land by applying one, two, or all three of the above-named elements of fertility; another set of equally careful experiments must be tried whenever a different crop is attempted upon the same land, or the same crop upon another piece of land.

This necessitates the farmers' trying all these experiments upon their own land; which is out of the question, for while they might, they certainly will not do it.

Therefore commercial fertilizers will perforce have to be applied in the future as in the past, mostly at random.

I do not wish to be understood as saying that commercial fertilizers are not valuable and useful in their place; which place is *not to take* the place of barn-cellar manure, but as an economical adjunct to it in the hill and drill.

The chief objection to depending *in the main* upon them is, that in the majority of cases the fertilizer costs more than the crop will bring.

No great agricultural prosperity can come through the increased use of commercial fertilizers, except as aids to barnyard manure.

Experiments in England have demonstrated that the crop does not increase in proportion to the amount of fertilizers applied, even when the most consummate skill directs the operations.

While agriculture has not been benefited to the extent hoped for by the processes mentioned above, there was one man who was patiently experimenting, and endeavoring to solve the problem in an entirely different way.

It has long been apparent to every observer, that there is an immense loss sustained in the manner in which all forage-crops have been cured from time immemorial, viz., by desiccation or drying. While it is agreed by all that a larger proportion of all vegetable growth comes from the atmosphere than from the soil, it does not appear to have struck scientific agriculturists that during the process of curing by drying, a very large proportion of the most valuable elements of nutrition are returned to the atmosphere from whence they came.

“The cow which gives us in summer while feeding on green grass such excellent milk, and butter of such agreeable color and flavor, furnishes us in the winter, — when she eats the same grass converted into hay, — an inferior quality of milk, and pale, insipid butter. What modifications has this grass undergone in changing into hay? These modifications are numerous. It is sufficient to cross a meadow when the new-mown grass is undergoing desiccation, to recognize that it is losing an enormous quantity of its substance that exhales in the air in agreeable odors, but which, if retained in the plant, would serve at least as condiments favoring digestion and assimilation. All stock-raisers know how rapidly young stock increases in weight in summer upon green pastures, and also that the same amount of grass converted into hay and judiciously fed in winter does not always prevent them from shrinking, and seldom gives any increase.

“The loss by desiccation in fine weather under the best conditions, added to that caused by the physical modifications which render mastication and digestion of the hay more difficult than of the grass, and consequently assimilation less complete, merits the most seri-

ous attention on the part of those who are interested in agricultural affairs.

“Rains, and even dews, add immensely to the deterioration inseparable to a process of curing by dessication. What agriculturist has not seen a hundred times his hay, notwithstanding the utmost care, injured by rain, deprived of its richest and most assimilative elements? If these things occur to the common fodder-crops, — timothy, orchard-grass, clover, &c., — what would (or rather, what *does*) happen when the saving of fodder-crops of high growth and great yield, such as maize and sorgho, or even Hungarian grass or millet, is attempted by desiccation? never in our temperate climate could we obtain for these a sufficient desiccation by the sun” when raised on a large scale. I have seen a neighboring farmer working nearly three weeks to cure about an acre of millet, and then it was very imperfectly preserved.

M. Aguste Goffart, whom not only all agriculturists, but the whole world ought to honor as it has no other man, commenced his experiments in preserving fodder by other means than drying, nearly or quite thirty years ago. It is reasonable to suppose that he met with failure after failure; but not discouraged he persevered; and during the last four years has so improved upon his earlier methods, that the preservation of any and all green crops, with all their valuable attributes unimpaired, is no longer an experiment.

I will not take space to describe M. Goffart's Silos and methods; but would recommend all those who wish to investigate the French system to send to J. B. Brown, Esq., No. 55 Beekman Street, New York (the translator of M. Goffart's treatise) for a copy of “*Ensilage of Maize*,” and study it.

CHAPTER II.

DESCRIPTION OF THE "WINNING-FARM" SILOS.

I WAITED long in hopes that one of our agricultural colleges or experimental stations would take the initiative.

The following letters convinced me that there was no use in waiting for more half-way experiments to be tried, where "half of the fodder went to waste," and the balance was so imperfectly preserved that it was "very difficult to remove the peculiar and very disagreeable smell from the hands after touching it : " —

NEW YORK, July 26, 1879.

JOHN M. BAILEY, ESQ.

Dear Sir, — . . . Can you not effect a combination, and build a Silo of masonry, and make a business of it this fall? I have not yet heard of any one who is going to do it thoroughly. . . . I speak of combination, as all seem to be afraid to do it right on account of the expense. I don't think any thing but masonry is sure, and that is. . . . I have urged all the enterprising and competent farmers I am acquainted with to be the *first* to do it on Goffart's plan, but I have not succeeded as far as I now know.

Yours truly,

J. B. BROWN.

If any thing was necessary to convince me that I must depend upon myself, this letter was enough. Mr. Brown knew of Mr. Francis Morris's experiments and their unsatisfactory results; hence his anxiety that I should test

the system in a thorough manner: therefore I resolved to brave the danger of being "laughed at;" and as no one could be induced to try the great experiment, and that the public should not lose the benefit of a system of such vast importance to the welfare of our nation, and fearing also that the grand discovery of M. Goffart's might fall into disrepute in consequence of not being tried in a thorough and scientific manner, I decided to make the experiment.

For several years I have been trying to find the way to raise profitable crops, or to turn them to profitable account when raised. I eagerly scanned every item which appeared in the public press bearing upon the process of preserving forage-crops in their green state. All the plans seemed to give but imperfect results; nevertheless, there seemed to be value in the *idea*.

It was therefore with pleasure I saw a notice of Mr. Brown's translation of M. Goffart's work upon "Ensilage." I sent for it. Upon a careful perusal of the work, and some little discussion in the columns of "The Country Gentleman" with Mr. Brown upon some parts of it, I became satisfied that the principle was right, that M. Goffart's method — with such modifications as climatic differences demand — faithfully carried out, would bring success.

Having resolved to try the experiment thoroughly, on the seventeenth day of July, 1879, I broke ground, selecting a side hill, and locating the Silos so that the corner joined the north-east corner of my barn: I excavated on the west side and south end seven feet deep, and put in a solid stone wall on the west side, 44 feet long and 12 feet high. This was built of very heavy stone and in the most substantial manner.

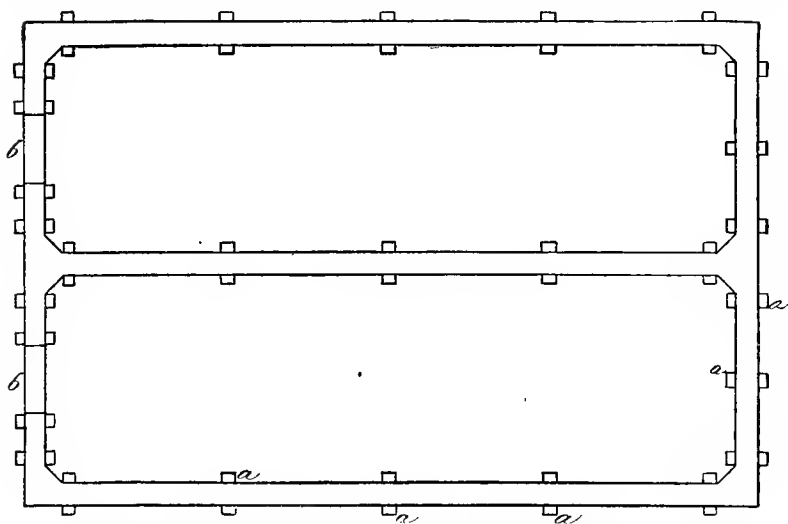
I afterwards graded up on this side to the top of the

wall, making a level spot to set an engine and Ensilage cutter upon; also to drive upon to deposit the corn fodder as it came from the fields on dump-carts. It took 13 days' work of a stone-mason, $43\frac{3}{4}$ days' work of laborers, and $28\frac{1}{2}$ days' work for one horse, to excavate and build the stone wall and foundations for the Silos.

On the tenth day of August I commenced building the Silo walls. These are 15 inches thick, built of concrete in the following manner.

First, 3×4 joists are set up at each of the angles, and also at intervals of about eight feet on each side of the walls. These scantling are placed eight ~~feet~~ⁱⁿ apart, spruce plank 12 inches wide and $1\frac{1}{2}$ inches thick are set up on the inside of the scantling, which leaves 15 inches between the planks ^{as} and the thickness of the walls.

We are now ready to commence building the Silo walls. The concrete is made by mixing one barrel of



aa. — 3×4 inch scantling, to hold $1\frac{1}{2}$ inch plank while building wall.
bb. — Doors.

Newark, Rosendale, or Akron cement, with three barrels of plastering sand and four barrels of clean gravel. This is thoroughly mixed together while dry. It is then wet and thoroughly mixed again, making a very thin mortar.

About three inches in depth of this mixture is put in between the planks; then stone of all sizes and shapes are packed and bedded in this layer of concrete, after which another layer of concrete is poured in on top of this layer of stones, and the operation is repeated until the space between the planks all round each Silo is filled; then the planks are raised about ten inches, and the space filled with concrete and stones as before until the walls are at the desired height. The best way is to have a sufficient number of hands to just raise the wall the width of the plank each day. Time was pressing with me, however; and I sometimes raised the plank two and three times in one day, the concrete "setting" so that I was able to do so safely. But I do not recommend this haste, as the walls will not be as smooth as they would be if the cement had all night to "set" in before the planks were raised. A 4×12 inch sill was bedded on the wall in the last layer of concrete. This sill was made of 2×12 inch spruce plank nailed together. Upon these sills a building was placed with posts five feet high, the beams on the top of these posts being thoroughly braced to the posts, thus firmly tying the whole structure together.

In sections of the country where clean sand, gravel, or stone is not easily obtained, Silo walls may be constructed of brick in the usual manner of brick buildings.

To put up the concrete walls and bed the sills, together with grading the upper side, where the cutting of the fodder is done, took of the foreman $28\frac{1}{2}$ days,

work of laborers 149 days, and 34 days' work of one horse. Putting up the frame to hold the plank took two carpenters two days. It required 124 barrels of cement, costing \$1.25 per barrel in Lowell. The teaming of the cement and lumber is included in the above account of time of horses and laborers. The cost of the whole structure will of course vary in different locations, as the cost of labor and materials varies.

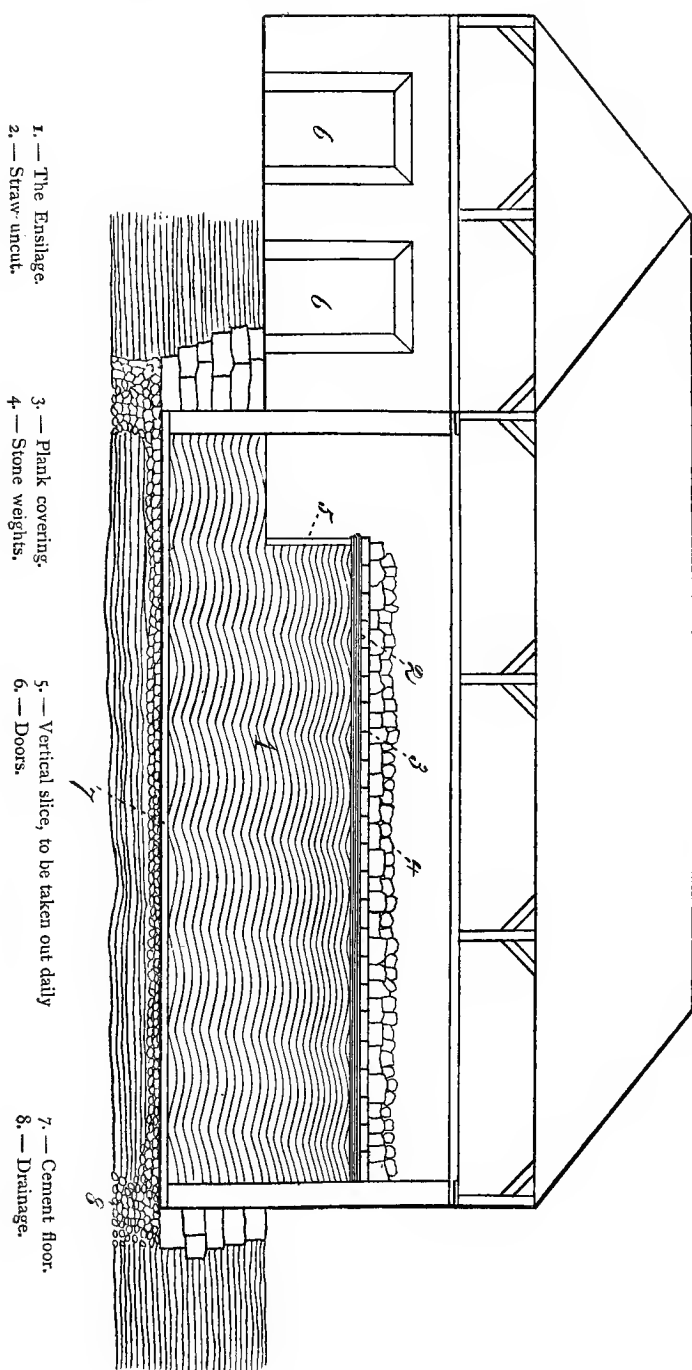
My Silos (capacity about 800,000 pounds) cost me about \$500. In other words, Silos will cost about one dollar and a quarter for each ton's capacity. Large ones will cost less, small ones more. The following diagram illustrates my Silos.

Silos may be built of stone pointed with cement mortar and plastered on the inside, or of brick, or of concrete as mine are. Whichever material is the cheapest and most convenient in any locality is the best to use there. Brick will cost more than the concrete. Concrete wall costs about ten cents per cubic foot.

As a general rule, Silos should be built rectangular in form, the width being about one-third the length, and the height about two-fifths of the length, and if possible should be sunk about one-half below the surface of the ground.

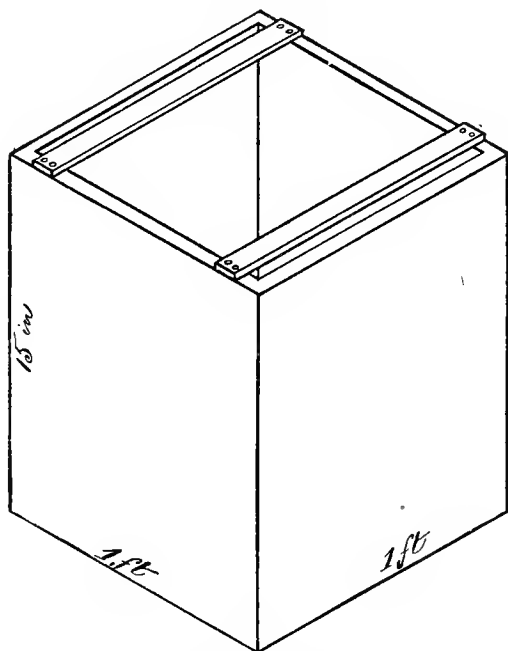
If there is a side hill near the stables, so that the surface of the earth will come nearly to the top of the walls at one end of the Silos, it will be found very convenient in filling the Silos, in weighting the Ensilage, and in removing the weights as it is fed out.

These walls must be built sufficiently strong to withstand when empty the pressure of the earth inward, as well as the pressure outward, caused by the settling of the Ensilage under the superimposed weights placed upon it.



Where it is not convenient to get stone for weights, heavy logs of wood may be used, sawed in pieces about three feet in length, and placed on end all over the planks which cover the Ensilage; three feet of wood being about equal in weight to one foot of stone. Or broken bricks may be obtained at the brickyards at a nominal price. Where neither of the above is available, bags or boxes of earth may be used as weights. Where boxes of earth are used, they should be made of such a size as to fit close together side by side.

M. Goffart recommends that the corners be rounded. I thought that cutting them off, as shown in the diagram, would answer as well and be much less expensive. I find, upon opening the Silo, that the Ensilage is pre-



Earth-box for weights, showing convenient handles which will not interfere with piling the boxes when removed.

served as well and settled as evenly in these corners as elsewhere ; also that the preservation is just as perfect close to the walls as in the centre, showing that a concrete wall is more impervious to air than a brick one.

CHAPTER III.

FILLING THE SILO.

I COMMENCED cutting my green-corn fodder on Sept. 22, and finished putting on the stone for weight at three o'clock P.M., Sept. 30, putting in about two feet in depth daily. This is fast enough; for the shrinkage will then be much less when the weights are put on than it would be were the Silo filled faster.

The seven acres of corn-fodder filled one Silo to within about $5\frac{1}{2}$ feet from the top. Upon the top of the Ensilage I put about one foot of rye straw uncut. Then I commenced at one end, and floored it over by laying $1\frac{1}{4}$ inch spruce plank crosswise the entire length. Upon this floor I put about 25 tons of bowlders. I am not sure that the straw is necessary: further experiments will decide. I shall use less next season.

The Ensilage settled about $1\frac{1}{2}$ feet. There has been no odor or steam arising from it. The cost of cutting the corn up, hauling it to the cutter, cutting it $\frac{4}{10}$ of an inch long, and packing it in the Silo, was not far from 75 cents per ton.

It was new work. The cutter was not adapted to the business, clogging badly and necessitating slow feeding. All this combined to make it cost more than it will when we become used to the work of handling large amounts of green-corn fodder.

The corn-fodder can be cut in the field with corn-knives cheaper than by the mowing-machine. The men as they cut it lay it in bunches; for it is much easier for the drivers to load it when laid in bunches, than to gather it up after the mowing-machine. The extra cost in cutting is more than made up by the expedition in loading and hauling.

I think the cost of Ensilaging 300 to 400 tons, when we have the right kind of a cutter (Baldwin's American fodder-cutter all sizes, adapted to large as well as small farmers, substantially built and at reasonable prices, is the best one I have seen: they are manufactured for, and are for sale by, Joseph Breck & Sons, the old and reliable seedsmen and dealers in all kinds of agricultural implements, Boston, Mass.: I have bought seeds and tools of them for many years, and have always found them reliable and trustworthy), will not exceed 40 cents per ton. This is less than it would cost to go to the field, and cut and haul it into the barn; and, after it is in the barn, the labor of feeding the *whole* fodder is much more than to fill a basket in the Silo and give it to each animal. Therefore it is cheaper to cut up the whole crop at one time, put it in the Silos, and feed it from them to the stock even in summer, than to go to the field for it as it is wanted.

Now, when it is considered that the corn-plant is at its *best* but a few days; that it can *all* be put into Silos when in the best condition; and that, notwithstanding great care in successive plantings, if used directly from the fields, much has to be fed either in an immature state, or when too hard for the cattle to masticate the stalks, — it will be seen that the saving, however considerable in planting as well as harvesting the whole crop at one time, is but a trifle compared to the gain in nutri-

tive value by being all cut at the right stage of growth, and preserved by the system of Ensilage with all its elements uninjured.

Ensilage is therefore the most economical method of soiling. The preserved succulent forage is improved by lying in the Silos, and at the same time the easiest and cheapest road by which green crops can reach the manger is through the Silo. It practically annihilates winter, and places the stock-raisers and dairymen in better circumstances than they would be if they had throughout the year the waving fields of oats or rye and the luxuriant corn in their best stage for soiling, from which to cut the daily food of their animals. The advantage of being able to plant or sow the whole crop at one time, and to cut and store it all at once, when in its most nutritive state, can hardly be over-estimated.

My corn was planted from the 15th to the 25th of June. On one acre was Stowel's evergreen sweet corn; the other six acres, Southern white corn.

There were at least twice as many tons of the latter to the acre as of the former. I shall plant no more sweet corn for Ensilage. The corn was all sown in drills about three feet apart, one bushel of seed-corn to the acre; was manured with about six cords of stable manure spread broadcast after ploughing, and harrowed twice with a Thomas smoothing harrow. It was planted with an "Albany corn-planter;" which, in addition to opening the drill, dropping the corn, and covering it, also deposited about two hundred pounds to the acre of a mixture composed of equal parts of superphosphate, cotton-seed, meal, and gypsum. A portion did not come up well, and had to be replanted. The dry weather and cool nights of the summer of 1879 prevented a rapid growth in certain portions. In fact, it was not a good

corn year, so that the crop was somewhat uneven at harvesting. The leaves at the bottom of the stalks had largely become dry and dead, and a sharp frost when the cutting was about half finished injured somewhat the leaves on that portion still standing in the field. Some of the stalks had ears large enough for roasting ; and the whole of it, I think, was rather too mature.

There was estimated to be in the Silo when opened 125 tons. The crop was very uneven, some parts having at least 40 tons to the acre. Upon other parts, where the drought affected that which was replanted, the yield was not over 10 tons per acre. I do not think it will be at all difficult to raise 40 to 75 tons per acre upon an average on good corn-land. It should be planted from the 1st to the 10th of June. It will then be in full blossom, and in the best condition to cut, by the last of August and before any frost can injure it.

As stated above, the cutting was finished on the 30th of September. It was decided to open it on the third day of December ; and, as the condition of the Ensilaged maize was a question of the utmost importance, it was, upon the suggestion of Mr. Brown, decided to have the "opening of the Winning-Farm Silos" a public matter "*as the American Initiative.*"

Accordingly invitations were sent to quite a number of gentlemen, well known for their interest in agriculture, as well as for the benefit they have conferred upon the whole country in the untiring efforts they have made to improve not only our system of cultivation, but our domestic breeds of cattle and all the fruits of the earth which minister to the wants and add to the pleasures of mankind.

CHAPTER IV.

OPENING OF THE SILO.

UNFORTUNATELY the meetings of the State Board of Agriculture and the Massachusetts State Dairy Fair, were held on the same day as the opening, which prevented the attendance of many gentlemen, who, however, sent letters of regret expressing great interest in the result.

The following letter was received from the United States Commissioner of Agriculture:—

DEPARTMENT OF AGRICULTURE, WASHINGTON, Nov. 23, 1879.

J. B. BROWN, 50 *Beekman Street, New York.*

Dear Sir,—I am much gratified to receive and thank you for the invitation to attend the opening of the FIRST American Silo at the farm of Mr. John M. Bailey at Billerica, Mass.

As Congress will be in session at the time mentioned, it will not be possible for me to attend, a fact which I regret very much. Will you have the kindness to convey to Mr. Bailey my sincere regrets, and ask him to give me a detailed statement of the experiment from beginning to end, for publication in my next annual report?

I look upon the system of Ensilage as one which has wrought wonderful changes in certain French provinces, and from which we may hope for greater success in this country.

It will prove, I have little doubt, a very decided advance in our agricultural methods.

Very respectfully yours,

WM. G. LE DUC, *Commissioner.*

The following letter from Hon. Marshall P. Wilder shows us that neither his advanced age, nor the painful accident from which we all rejoice to know he is rapidly recovering, has diminished his interest in all that pertains to an improved agriculture : —

BOSTON, Dec. 2, 1879.

My dear Sir, — I would be glad to be at the "Winning reception" to-morrow, but I am not sufficiently recovered to take the journey. With thanks for your kind invitation,

I am yours as ever,
MR. BAILEY. MARSHALL P. WILDER.

RAMSEY'S, BERGEN COUNTY, N.J., Nov. 27, 1879.

MR. J. B. BROWN.

My dear Sir, — In reply to your letter of the 19th inst., I regret to say that I shall leave in a few days for California, and am therefore unable to accept the invitation of Mr. Bailey to be present at the opening of his Silo of 120 tons of "Ensilage," on the 3d of December, on his farm at Billerica, Mass.

I have no doubt that the preservation of corn-stalks green for winter fodder will soon become the great resource of our farmers, giving, as it will, increased remuneration to agricultural industry.

Mr. Bailey is to be congratulated upon giving the FIRST public exhibition of Ensilage, which promises such important changes.

I am confident, from the investigation I have given the subject, that it will be a convincing showing of its great national value to all present. I have felt for the last three years that I could render no greater benefit to my neighbors, than to direct their attention to this system of husbandry.

I am, with great respect, your obedient servant,

RODMAN M. PRICE.

MORETON FARM, ROCHESTER, N.Y., Dec. 2, 1879.

JOHN M. BAILEY.

Dear Sir, — I received your kind invitation to be with you to-morrow. Nothing would please me better ; but I am so busy with my seeds, that it will be impossible to spare the time.

I think you have struck the right idea.

Respectfully yours,

JOS. HARRIS.

Letters were also received from the agricultural editors of the "New York Tribune," "New York World," "Land and Home," and other journals, asking for information as to the experiment; and also from Professors Stockbridge, Goessmann, and Maynard, Richard Goodman, Esq., H. H. Commins, Esq., William H. Bowker, Esq., T. G. Huntington, O. A. Hillman, S. C. Stone, and many others interested in agricultural developments.

Mr. G. B. Brown, President of the "New York Plough Company," and translator of M. Goffart's book, was present; and there were quite a large number of gentlemen from New York and the New England States.

After briefly looking at the Berkshire swine, Oxfordshire-down and Cotswold sheep, and Jersey and short-horn cattle, the company repaired to the Silos; and to say that there was a good deal of anxiety felt while the stones and spruce plank were being removed for the space of about three feet at one end of the Silo, would be stating no untruth.

The top and edge of the Ensilage next the door for two or three inches, was somewhat musty, and in places almost rotten. But directly below this the fodder came out cool, soft, moist, and wholesome looking, with a strong alcoholic odor, and quite acid. It was evident that fermentation had been going on until acetic acid had been formed.

The following from the report of the editor of "The Lowell Journal," who was present, will describe the impression received by those present at the "opening:"—

"There was, however, no unpleasant taste, except the acidity, and no unpleasant smell.

"There were twenty or thirty head of cattle on the farm, as well as sheep, swine, and horses. They were all given some of the Ensilage.

"The hogs ate it greedily. The sheep also seemed very fond of it.

The neat stock were not so eager for it at first; but most of them seemed after a while to acquire a taste for it, and soon manifested a desire for more.

"There were spots where the fodder was not so sour; but it was evident that it did not come out the sweet, fresh, and palatable fodder which has been secured in the French Silos.

"The reasons which may be ascribed for this are various. Mr. Brown thought it was due to the maturity of the fodder when cut.

"It may be that being just at the upper corner, near the door, the preservation from oxygen was less perfect than will prove to have been the case farther down in the mass.

"The numerous dry and dead leaves caused by the drought and frost may possibly have something to do with it. We shall know more about this as the Silo is emptied.

"One thing is certain thus far: the fodder is *so well* preserved that the cattle *will eat it*, and there is no question but that they will *thrive on it*.

"Since writing the above we have received a note from Mr. Bailey, dated Dec. 5, in which he says, —

"'Yesterday morning we fed what Ensilage was taken from the Silo while you were here. All of the animals but four ate it all, licking out their mangers clean. The four finally ate theirs up before noon. This morning we fed about a bushel to each grown animal, and a proportionate feed to younger ones. I am pleased to state that they have all eaten it up clean. The acidity appears to be much less than when first opened, and there is emitted — as there should be — a strong alcoholic odor. I think that under the circumstances we can claim it as a perfect success.'"

There can be no doubt that the cause of this acidity, and the alcoholic odor in the Ensilage, is on account of the stalks being too mature before cutting.

Professor Goessmann writes that "acetic acid had formed in the stalks before they were cut."

If cut at the period of blossoming, but very little acetic fermentation will take place in the Silo, and no alcoholic fermentation until after it has been exposed in a large pile to the action of the atmosphere.

I think there is always more or less acidity present.

From a report to the Central Agricultural Society of France by a "committee of the sections on live stock, physico-chemical and high cultivation," upon the subject of the "Ensilage of green-cut corn-fodder séance, April 7, 1875," I make the following extract:—

"The fodder has an alcoholic odor quite marked and slightly acid. It is eaten with avidity by the cows, and constituted their sole food since the commencement of winter. We were struck by the hearty appearance of the 28 or 30 cows. Their eyes were bright, their skins soft, and they are in good condition. (Goffart's 'Ensilage of Maize.')

On the 9th of December the following report was made to "The Country Gentleman:"—

ENSILAGE IN MASSACHUSETTS.

EDITORS COUNTRY GENTLEMAN:—

The "Winning Farm Silos" are a perfect success. The preserved corn-fodder which was cut about $\frac{4}{10}$ of an inch long, and placed in the Silo about the last of September, and subjected to heavy and continuous pressure, is being fed to the stock. They all eat it with avidity. Its preservation is perfect. It has an alcoholic odor, and is somewhat acid. My stock eat it all, lick out their mangers, and look wistfully for more. When the Silo was first opened, Dec. 3, there appeared to be a strong acidity, so much so that some of the gentlemen present were somewhat disappointed; but as we get farther into the mass of Ensilage the acidity is much less, while the alcoholic odor upon exposure to the air several hours is much stronger.

I tried a little experiment with it this afternoon. I had a pen of seven Oxfordshire-downs, and another pen of five maple-shade Cotswolds. They had just been fed with some clean bright hay. In another feed-trough I put some Ensilage. Five of the seven Oxfordshire-downs left the hay, and ate the Ensilage, and four of the five Cotswolds left their hay and did likewise.

I feed, in place of the ration of hay, 25 to 30 pounds of Ensilage to each cow in the morning, and the same at night, which has lain upon the barn-floor all night, during which time fermentation is quite active so that it is warm in the morning.

The Ensilage in the Silo which is compacted, although exposed to

the air seems to undergo no change. It is pressed so hard that the air cannot enter, and therefore does not affect it at all. I am delighted with the success of the enterprise.

I believe it is possible to keep four cows a year upon corn fodder Ensilage raised upon one acre of land. Verily we are under the greatest obligation to M. Goffart, and to J. B. Brown; to the former for demonstrating to our satisfaction that corn-fodder can be successfully preserved in this manner, and to the latter for *translating* M. Goffart's work into English so that we may profit by his great success. If he is truly blest who "causes two blades of grass to grow where only one grew before," how much more to be honored is this man who has taught us how to keep four cows upon an acre of land where one cow would find but scanty subsistence before! A most fortunate agricultural revolution is indeed impending, and one which I trust many of our progressive farmers will engage in during the coming season.

JOHN M. BAILEY.

"WINNING FARM," BILLERICA, MASS.

CHAPTER V.

COST OF KEEPING STOCK UPON ENSILAGE.

THE following statement from a gentleman whose estate joins "Winning Farm" will be read with interest.

JOHN M. BAILEY, ESQ.,
Winning Farm, Billerica, Mass.

Dear Sir, — In accordance with my suggestions made on the occasion of the opening of your Silo, Dec. 3, I have used your Ensilage in manner as follows. My small herd of six cows calved early in the spring, viz., in the months of March and April. They are of the ordinary New England stock, with no pretensions to any pedigree. I sell no milk; and my cows, such as they are, were selected more for their butter-making qualities than for any extra milking properties. These cows had served through the season for butter-making, and with the commencement of cold weather and the stoppage of "fall feed" had begun to shrink in milk.

Previous to the use of your Ensilage, the six cows had been fed two bushels of flat turnips, with four quarts of bran to each cow daily, and what dry corn-fodder they would eat. The amount of milk given by them daily was 30 quarts, from which 18 pounds of butter were made per week.

I commenced using your Ensilage on Wednesday, Dec. 10, and left off using it on the 17th, feeding 18 barrels, or 54 bushels, during the week. All but one cow took to the fodder at first kindly, and their appetite for it increased from day to day. There was an increase of milk from 30 quarts to 35 quarts daily. The cream was thicker, of richer color, and of better quality, than from their previous feeding. One sack of bran of the value of 90 cents was all that the cows ate dur-

ing the week in addition to your Ensilage, except a small amount of bog or meadow hay of nominal value.

The account for this week would therefore be for the six cows : —

54 bushels Ensilage (1,620 lbs.), @ \$.001	\$1.62
1 bag wheat shorts . . . . .	.90
	<hr/>
	\$2.52

The cows should be credited with 22 pounds of butter at 35 cents a pound, and say 210 quarts of skim-milk at one cent per quart, which I consider its value as feed for the pigs.

22 pounds butter, @ \$.35	\$7.70
210 quarts skim-milk .01	2.10
	<hr/>
	\$9.80
Cost of keeping	2.52
	<hr/>
Profit	\$7.28

The flavor of the butter was excellent, and its color a good yellow equal to that which sweet pasture gives.

In the above brief statement I have confined myself strictly to facts, and will make no comments, except to say that I am convinced that your method of preserving green fodder for use in winter time is a success, and will eventually be adopted in this part of the country.

HENRY B. JUDKINS.

Since receiving the above, Mr. Judkins informs me that his cows shrank so that they gave but 20 quarts daily, three days after resuming dry feed.

This is about what they would have shrunk to by this time, had the natural shrinkage not been arrested and an increase caused by the one week's feed of Ensilage.

I have a Jersey heifer 20 months old which has doubled her yield of milk since I began to feed Ensilage. I have one cow 13 years old which came in Dec. 1, three weeks ago. She is now giving 16 quarts daily upon 60 pounds of Ensilage and four quarts of shorts. I am feeding 35 head of cattle and 100 head of sheep upon 45 bushels (about 1,350 pounds) of Ensilage, and 80 cents'

worth of shorts, and less than 50 pounds of hay daily. I cannot make the cost of corn Ensilage to be more than *one mill* per pound, or \$2 per ton.

It will, therefore, be seen that the expense of keeping 35 horned animals and 100 sheep at "Winning Farm" is as follows:—

1,350 pounds of Ensilage @ \$.001	.	.	.	\$1.35
90 pounds of shorts	.	.	.	.80
50 pounds of hay @ \$15 per ton	.	.	.	.37½
Total cost per day	.	.	.	\$2.52½

The cost of keeping the above stock upon hay and grain would be as follows:—

20 pounds of hay to each animal (ten yearlings counted as five cows), making 30 head, would require daily as follows:—

600 pounds of hay for cattle, at \$15 per ton	.	.	.	\$4 50
200 pounds of hay for 100 sheep	.	.	.	1 50
120 pounds of shorts for cattle, at \$18 per ton	.	.	.	1 08
40 pounds of shorts for sheep	.	.	.	36
Total cost of keeping 30 cattle and 100 sheep per day on hay and grain	.	.	.	\$7 44
Cost of keeping the above on Ensilage as above	.	.	.	2 52½
Daily balance in favor of Ensilage	.	.	.	\$4 91½

From my experience in feeding so far, I consider Ensilage to be worth one-half as much as the best timothy hay. I would not, however, exchange Ensilage for hay and give two tons for one. I believe that 40 to 75 tons of corn-fodder can easily be raised upon an acre, which if properly Ensilaged will be equal to from 20 to 37½ tons of hay. To receive the fullest benefit, however, I think there should be some nitrogenous food, such as oats, shorts, pea or bean meal, oil meal or animal meal, fed with the Ensilage.

Judging from the appearance and the droppings of my animals, I believe they are fed as high as young and breeding stock should be fed.

There is another advantage: after the corn is cut and put into the Silo, — the last of August or first of September, — the land can then be ploughed, and sown with winter rye. The summer, fall, and winter accumulations of manure can be hauled out, and spread broadcast upon the rye at any time after it is sown, during the fall and winter months or early spring. The rye will be in blossom, and ready to cut, between the 10th and 25th of May, and should be cut $\frac{4}{10}$ of an inch long, and put into the Silo in the same manner as the corn fodder.

Land highly manured ought to give ten tons of green rye for Ensilage per acre. The manure having been applied to the land during the time it was occupied by the rye, nothing remains but to plough in the rye stubble, and drill in the corn. Thus 40 to 75 tons of Ensilage can be easily raised from one acre of good corn-land.

I roll my fodder-corn land as soon as planted, harrow with a Thomas smoothing-harrow just as it is pricking through the ground, and once every week or ten days until it is about a foot high. Then, if there appear any weeds, I go through it once with a horse-hoe. I like the Centennial horse-hoe, manufactured by Timothy B. Hussey, North Berwick, Me., best of any I have tried.

In conclusion, let me urge every farmer, who can, to build a Silo. They will have to build sheds to accommodate the stock they will be able to keep. Silos and cheap cattle-sheds are much cheaper than expensive hay-barns.

No manure-cellars are needed. Cement the floors of the cattle-sheds (it costs less than a plank floor), so as

to save all the manure, both solid and liquid ; bed them, with leaves, meadow hay, or any kind of hay, for that matter.

Apply the manure as it is made, broadcast upon the rye fields. The land will continually grow richer, the crops of rye and corn fodder heavier. The stock upon the farm will increase in number and value until agriculture will become the most profitable as well as the noblest avocation which shall engage the attention of intelligent and refined manhood.

The foregoing was—it will be seen—written at intervals, from the time of opening the Silo until about the third day of January, when I went to Virginia to visit my stock farm in Sussex County. A month had elapsed since I first began to feed the Ensilage, and I was absent from “Winning Farm” about a month.

Although letters from my manager had informed me from time to time that “the Ensilage works better every day,” still I was unprepared to see such an improvement in the general appearance of the stock. They looked as if they had been at pasture with feed up to their eyes, sleek and smooth. Hundreds of people have visited “Winning Farm” during the winter to see the Silos, and examine the stock fed upon Ensilage. All expressed the same surprise and delight at their appearance. It is all eaten, not a pound is wasted : sheep, hogs, cattle and horses, all like it. Sheep seem to be as fond of it as they are of oats. In January I purchased the maple-shade flock of Cotswolds, or, at least, all the best ewes in the flock. Since their arrival at “Winning Farm” they have been fed Ensilage daily.

CHAPTER VI.

TIME WHEN FORAGE PLANTS CONTAIN THE GREATEST AMOUNT OF NUTRITIVE VALUE.

A GREAT advance has been made within a few years in agricultural knowledge; and among the most valuable facts learned has been this, that grass contains a greater amount of nutrition when in blossom than at any time before or afterwards.

What is true of the common grasses, viz., timothy, red-top, orchard-grass, and clover, is equally true of corn, which is but a gigantic grass.

If, then, a stalk of corn contains at the time it blossoms more nutritive value than at any subsequent time, how foolish and wasteful to let it stand for the ear to form at the expense of the stalk, while at the same time great loss is going on from the leaves and the stalk, as is the case with other and smaller grasses.

The seed formed in the head of a stalk of timothy or other grass — while very rich and nutritious in itself — does not by any means compensate for the loss which has been sustained by the stalk and leaves while the seed is forming and ripening.

The loss which is sustained in the ripening process is not all. By expending a great amount of labor the corn is shucked and put in the cribs. There it suffers more or less from the depredations of rats, mice, and other vermin.

We re-shock or stack the corn-fodder. If we hope or expect to induce our cattle to eat much of the stover, we must cut it with a powerful cutter; next the corn must be ground, and carefully mixed with the cut corn-fodder. Then it must be steamed; and after all this labor and expense the stock will nose it about in their mangers, and leave enough of it to keep themselves well bedded. Now what do we accomplish by all this shucking, cribbing, grinding, cutting of the fodder, mixing and steaming? Why, we have been getting up a very poor quality of "Ensilage"!

After the stalks and leaves had become almost worthless by exposure to the rains and dews while the ripening of the ears was being accomplished, we then, by an expensive, laborious, and roundabout way, try with all the appliances of steam and machinery to get the corn *back into the stalks* so that we can induce our cattle to eat them.

Why not take and preserve the plant when its nutritive value is the greatest? when all its valuable elements are mixed and blended in an harmonious whole exactly adapted for the healthy sustenance of our domestic animals, by that Master Chemist whose handiwork as seen in the tiniest leaf is so far in advance of our most skilful combinations that we can never even hope to comprehend *how* it was formed from the original elements.

It will be almost unnecessary to state that this system of preserving corn-fodder is equally well adapted to all the grasses, clover, Hungarian grass, millet, pea and bean vines, and, in fact, to all kinds of forage-crops, particularly heavy crops of aftermath, which it is often impossible to cure by drying, owing to the lateness of the season, the sun by the obliquity of its rays having lost much of its potency.

There is no doubt in my mind that there is more *available* nutrition in a kernel of grain when it is fully grown, before it has had time to harden, before a part of its substance has been converted into a hard, tough envelope which is almost indigestible, than at any subsequent time. This hard protecting envelope is a wise and providential provision to protect the kernel as a *seed* for future crops. Heretofore no means have been known to preserve grain except by ripening and drying, nor to cure forage crops except by drying: since Ensilage has been proved practical, we may now harvest all our crops when they contain the greatest available amount of assimilable nutritive elements, and preserve them unimpaired indefinitely. In this view of the object of *ripening* grain, the conclusion is irresistible that the nutritive acme in corn and other grain is to be found at or before the blossoming period, as it is in the grasses.

It is by no means certain, so far as the *kernel* of grain itself is concerned, that the ripened grain contains as large an amount of available nutritive elements as it does when in the milk. I have often observed that pigs when fed upon soft corn grow better than when fed upon old corn. Experiments in feeding swine at the West, reported in "The National Live Stock Journal," show this. In the August number I find the following:—

"There is no article of food for swine, available to the ordinary farmer, that will fatten hogs so rapidly as green corn. Its use may be commenced just as soon as the kernels are fairly filled with 'milk;' and the gain that young pigs, as well as mature hogs, will make upon this food is surprising. In preparing swine for exhibition at the autumn fairs, or for an early market for pork, nothing is equal to it."

CHAPTER VII.

ANALYSIS AND COMPOSITION OF CORN WHEN CUT IN ITS GREEN STATE.

THE following is taken from J. B. Brown's translation, and is a letter to Mons. A. Goffart from J. A. Barras, Perpetual Secretary of the Central Agricultural Society of France, and editor of "*Journal de l'Agriculture*."

"You do not seek to produce a fermentation." (Earlier in the experiments it was thought that fodder could only be preserved in a green state by fermentation. This is found to be a mistake: all fermentation is but the beginning of decomposition and decay, and should be avoided as much as possible. — J. M. B.) "You propose to maintain all its parts in a condition as near as possible like that of the plant at the moment it was cut.

"It is important to ascertain what is the distribution of mineral and organic matter in the different parts of the stalk of corn.

"When it is cut for the Silo it becomes a mixture of all parts of the plant in such a manner as to give to the stock those which are richest in nourishment as well as those that are the poorest.

"This is one of the advantages of the method. If you give the corn-plant to the stock in the natural state, they will eat first the tender parts, and will leave the hard parts which offer the most resistance to the teeth and have the least flavor.

"I have taken thirteen stalks of corn weighing altogether 37 pounds." (In reducing the weights and measures of the metric system to pounds, feet, and inches, I omit small fractions, getting it near enough for all practical purposes. — J. M. B.), "and have cut them up into six lots as follows. Each of these lots has been dried at 100 degrees (R.). The stalks were cut into three parts. The length of each portion was: upper

part, 25.50 inches ; middle part, 34.60 inches ; lower part, 31.50 inches. Average total length of each stalk without tassels being a fraction over nine feet.

Table No. 1.

	WEIGHT IN GREEN STATE.	WEIGHT AFTER DRYING.	WATER, OR LOSS PER CENT.
	Grammes.	Grammes.	
Leaves	4.805	1.315	72.63
Tassel . . . . .	.102	.047	56.07
Ear, with stem	3.026	.752	75.14
Upper part of stalk	1.270	.125	90.15
Middle part of stalk	2.446	.341	86.06
Lower part of stalk	5.146	.661	87.15
13 stalks	16.795	3.241	80.76

"Thus the water was quite unequally distributed in the stalk. They were more watery at the upper part, but the flowering portion was much less ; the grain was still milky.

"The relations between the different parts of the plant are found to be as follows :—

Table No. 2.

	GREEN STATE.		DRY STATE.	
	Per cent of Weight.		Per cent of Weight.	
Leaves	29.20	47.87	40.57	65.19
Tassel	66		1.42	
Ear, with stem	18.01	52.13	23.20	34.81
Upper part of stalk	7.56		3.85	
Middle part of stalk	14.86		10.52	
Lower part of stalk	30.01		20.44	
	100.00	100.00	100.00	100.00

"This shows that the stalks when green surpass in weight the remainder of the organs of the plant. They contain, however, a less proportion of dry matter, and less even than the leaves which have in the fresh state a much less weight.

"I have analyzed separately each of the six lots ; and I have obtained the following composition in organic substance, and ashes or mineral substance : —

Table No. 3.

	STALK.						ENTIRE PLANT.
	LEAVES.	TASSEL.	EARS.	UPPER.	MIDDLE.	LOWER.	
Organic substance	86.01	94.80	98.30	95.43	97.31	98.26	94.26
Ashes or mineral substance . .	10.99	5.20	1.70	4.57	2.69	1.74	5.74
	100.00	100.00	100.00	100.00	100.00	100.00	100.00

"Thus it will be seen that the mineral substance is accumulated in the leaves and upper part of the stalk.

"Here are the exact proportions of the mineral substance in the different organs of corn : —

Table No. 4.

Leaves	77.70
Tassel	1.22
Ear and stem	6.79
Upper part of stalk	3.13
Middle part of stalk	4.87
Lower part of stalk	6.29
	100.00

"Thus, more than 77 per cent of mineral substance is accumulated in the leaves, more than 14 per cent in the stalk, and only about six per cent in the ear.

"We will now ascertain the composition of the different parts of the plants, as appears when dried : —

Table No. 5.

	STALK.						
	LEAVES.	TASSELS.	EARS.	UPPER.	MIDDLE.	LOWER.	ENTIRE PLANT.
Nitrogenous substances . . .	6.28	6.27	11.09	4.34	3.86	3.37	6.47
Fatty matter soluble in ether .	1.30	1.90	2.50	1.00	.40	.30	1.28
Saccharine matter soluble in alcohol	6.50	4.70	8.30	17.50	20.60	21.00	11.77
Starch	64.33	25.23	73.51	39.49	38.65	35.79	56.35
Cellulose	10.60	56.70	2.90	33.10	33.80	38.00	18.37
Mineral substance	10.99	5.20	1.70	4.57	2.69	1.74	5.74
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Nitrogenous per cent	1.004	1.004	1.775	.694	.617	.540	1.033

* "The ear is found, as we would expect, much richer in nitrogenous substance than the other parts of the plant. The nutritive power (or comparative value) as it is agreed to define it, by the relation of the azotic substance to the sum of the fatty matter, sugar, and starch, is quite inferior in the stalks to that of the other organs, as the following table shows.

"Taking the ear as unity, the proportionate nutritive power is as follows :—

Table No. 6.

		NUTRITIVE VALUE OF THE WHOLE PLANT.
Leaves . . . . .	.66	2.54
Tassel	1.49	.09
Ears	1.00	2.57
Upper part of stalk . . . . .	.57	.17
Middle part of stalk . . . . .	.49	.41
Lower part of stalk . . . . .	.45	.69
		6.47

"The stalk, however, shows that it is very rich, and, above all, the leaves, which therefore should be taken care of for the cattle. The fatty matter is concentrated in the leaves and in the ear, the saccharine matter in the leaves and stalk, and mostly in the lower part of the stalk.

"The following table indicates the concentration of saccharine matter in the leaves and stalk : —

Table No. 7.

	EACH PART CONTRIBUTES.	PER CENT OF DIFFERENT PARTS TO THE WHOLE.
Leaves	2.64	22.36
Tassel . . . . .	.07	.59
Ears	1.93	16.41
Upper part of stalk . . . . .	.67	5.69
Middle part of stalk	2.17	18.45
Lower part of stalk	4.29	36.50
	11.77	100.00

"Cellulose substance is, as we would expect, in large proportion in the stalk, and mostly toward the lower part of it. It is principally in the leaves and ears with stem, that the starch and the other principles which are neither cellulose nor nitrogenous nor mineral are found : —

Table No. 8.

	Entire Plant.	Leaves.	Tassels.	Ears.	Upper part of Stalk.	Middle part of Stalk.	Lower part of Stalk.
Phosphoric acid	7.17	3.97	10.01	33.50	9.07	14.02	7.17
Sulphuric acid	3.81	3.21	6.13	3.58	5.61	8.65	3.81
Chlorine	1.35	1.04	2.73	3.52	2.15	Trace.	1.35
Potash	4.41	1.23	7.88	27.11	14.61	2.41	4.41
Soda	8.26	6.78	10.37	21.36	12.57	8.39	8.26
Lime	12.96	13.78	11.87	3.46	10.29	14.31	12.96
Magnesia	6.60	5.64	15.03	7.04	10.52	8.73	6.60
Iron	0.51	0.46	0.11	Trace.	2.08	0.63	0.51
Silex	54.75	63.76	35.83	0.34	29.83	41.37	54.75
Carbonic acid and waste	0.18	0.13	0.03	0.09	3.27	1.49	0.18
	100.00	100.00	100.00	100.00	100.00	100.00	100.00

"The above table shows that the ears are the richest in phosphoric acid and potash. These also contain the largest percentage of soda, the least of lime and silex.

"As to the distribution of each mineral element in the different parts of the plant, it is necessary, in order to study it thoroughly, to enter into a more detailed and separate examination. Phosphoric acid or phosphorus plays an important part in agriculture, not because it is more indispensable to vegetation than several other elements, but because nature has not distributed it with so much profusion in all lands or in the atmosphere as certain other elements that on that account are considered secondary. Indeed, there is not any one element in vegetation of any greater importance than another; and, if any person judges otherwise, it is because he places himself at the point of view of an agriculturist who, having need to produce certain crops of a special kind, needs to accumulate such elements as enter specially into their organization.

"Therefore, in order to obtain abundant food, in order to produce with rapidity domestic animals whose organs require much phosphorus, it is necessary to seek methods for increasing the supply of phosphates, more or less assimilable, that the plants may find in the bed where their roots develop.

"To indicate the sources of the supply, whether in the residuum of factories, or of the household, or in the numerous repositories, has been one of the greatest services rendered in modern times to agriculture by chemistry and geology.

"But there our knowledge ends: we are entirely ignorant as to how the phosphorus distributes itself in the vegetable, by what process it penetrates and circulates and accumulates in certain organs, or exactly what these organs are.

"As to the relative distribution of these elements; the following tables show as far as concerns maize fodder intended for green preservation by Ensilage.

PHOSPHORIC ACID.

Table No. 9.

	AMOUNT IN EACH PART.	PRESENT IN DIFFERENT PARTS.
	Grammes.	
Leaves	0.177	42.96
Tassel	0.007	1.70
Ears	0.132	32.04
Upper stalk	0.020	4.85
Middle stalk	0.026	6.31
Lower stalk	0.050	12.14
Whole plant, dry	0.412	100.00

SULPHURIC ACID.

“The rôle of sulphur in vegetation is nearly unknown: all that we know is that it is absolutely necessary. It is generally found in less proportion than phosphorus, in corn as 88 to 180.

Table No. 10.

	QUANTITY IN EACH PART.	PER CENT IN EACH PART.
	Grammes.	
Leaves . . . . .	.144	65.75
Tassel	0.005	2.28
Ears	0.014	6.39
Upper part of stalk	0.009	4.11
Middle part of stalk	0.016	7.30
Lower part of stalk	0.031	14.17
Whole plant, dry	0.219	100.00

CHLORINE.

“By the conclusive experiments of Prince de Salon-Horstman we know that chlorine is indispensable to the regular operations of the different phases of vegetation; but the most complete obscurity rests upon its real action.

Table No. 11.

	QUANTITY IN EACH PART.	PER CENT IN DIFFERENT PARTS.
	Grammes.	
Leaves	0.047	60.26
Tassel	0.002	2.56
Ears	0.014	17.95
Upper stalk	0.009	11.54
Middle stalk	0.006	7.69
Lower stalk	Traces.	Traces.
Whole plant, dry	0.078	100.00

POTASH.

“Berthier’s saying, ‘No plant without potash,’ has become a maxim.

Table No. 12.

	QUANTITY IN EACH PART.	PER CENT IN EACH PART.
	Grammes.	
Leaves	00.55	21.94
Tassel	0.006	2.27
Ears	0.107	42.29
Upper part stalk	0.036	14.23
Middle part stalk	0.041	16.20
Lower part stalk	0.008	3.17
Whole plant, dry	0.253	100.00

SODA IN CORN.

"In the whole plant 0.475 grammes, of which two-thirds accumulated in the corn and one-sixth in the ears.

LIME IN CORN.

"Lime has been considered necessary to plant-growth from a very ancient period : more than four-fifths are found in the leaves, only two per cent in the ear, and the quantity increases in descending the stalk.

MAGNESIA IN CORN.

"The role of magnesia in vegetation has been but little studied. There is no doubt, however, after the experiments made in Germany, that its presence is indispensable to plants. Two-thirds of it is found in the leaves, and the remainder equally divided in the other five parts of the plant.

IRON IN MAIZE.

"Iron is evidently of great importance to the life of animals who are nourished by vegetation. As with sulphur, chlorine, soda, lime, and magnesia, the greatest accumulation is in the leaves. But it is a noticeable fact that it is absent from the ear, which would seem to explain the opinion of physicians as to the insufficiency of corn-meal for exclusive human food.

"As to corn harvested green in order to be fed to cattle after Ensilage, the lack of it in the ear is equalized by its presence in other parts of the plant.

SILICA.

"It is probable that all silica enters the organs of vegetation in the soluble state. The quantity found is very considerable.

Table No. 13.

	QUANTITY IN EACH PART.	PER CENT IN DIFFERENT PARTS.
	Grammes.	
Leaves	2.843	90.45
Tassel	0.026	0.82
Ears	0.001	0.03
Upper part of stalk	0.042	1.33
Middle part of stalk	0.084	2.67
Lower part of stalk	0.147	4.70
Whole plant, dry	3.143	100.00

"Thus the stalk contains only about one-tenth part of the amount in the leaves, which contain 90 per cent of the whole plant."

Thus it is seen by the Table No. 1, that the ear with cob and stem forms but about one-fifth of the whole plant either in its green or its dry state. By Table No. 2, that the leaves contain of solid material over 40 per cent of the whole plant. By Table No. 4, that of the mineral constituents the leaves contain over three-fourths of all the mineral element in the whole plant.

But referring to Table No. 6 we find that when none of the valuable attributes of the plant are lost, the value of the ear as compared to the leaves is as 2.57 to 2.54; and, as compared to the whole plant, as 2.57 to 6.47. This shows the stock, leaves, and tassel to be worth nearly three times as much as the ear, taken when the ear is in the milk. Experiments made last season in the West showed that hogs fattened faster upon green corn (probably past the milky stage) than when fed upon old corn.

Table No. 7 shows that the ear and cob contain less than one-sixth as much sugar as the whole plant, and but little more than two-thirds as much as the leaves, and little more than one-fourth as much as the stalk.

While the ears are richer in proportion to their weight in phosphoric acid, — the most expensive mineral which we require to restore to our long-cropped fields, especially where dairying has been pursued, — still Table No. 9 shows that the leaves altogether contain one-fourth more than the ear, and that the ear contains but 32 per cent of that contained in the whole plant. Tables 10 and 11 show that the ears contain but 6 per cent of the sulphuric acid, and but 18 per cent of the chlorine. And Table 12 is still more instructive; for it shows that the leaves contain more than half as much potash as the ears, that the stalk contains nearly as much as the ear, and that the ear with the cob and stem contain but 42 per cent of the potash contained in the whole plant. Iron — that which gives color not only to the beautiful and luxuriant vegetation, but paints the rose upon the cheek of health, and gives vigor to the animal system, and strength and clearness to the human brain, — is not found in the ears at all.

Of silica we find that over ninety per cent is in the leaves, while but three one-hundredths of one per cent are in the ear.

The lesson I wish to draw from this summary is twofold. First, — it is shown that the ear contains, before the stalk has lost by deterioration through exposure to the weather, but a small part of the valuable constituents of the whole plant.

The following table, carefully compiled from the foregoing, gives the comparative value which the ear bears to the balance of the plant.

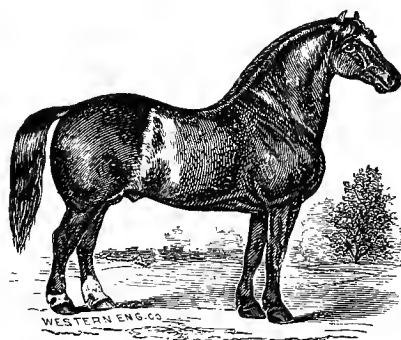
Nutritive Value of the Ear, compared to the Rest of the Plant.

	IN THE EAR.	IN BALANCE OF THE PLANT.	TOTAL.
Solid matter	23.20	76.80	100
Sugar	16.41	83.59	100
Mineral substances	6.79	93.21	100
Phosphoric acid.	32.04	67.96	100
Sulphuric acid	6.39	93.61	100
Chlorine	17.95	82.05	100
Potash	42.29	57.71	100
Soda	16.66	83.34	100
Lime	2.00	98.00	100
Magnesia	6.67	93.33	100
Iron	Trace.	100.00	100
Silica	0.03	99.97	100

Now, all of these mineral constituents are necessary for the health and well-being of our domestic animals; and when corn is cured by Ensilage they are all present in solution, so that when introduced into the alimentary canal such parts and proportions as the animal economy requires can be readily taken up and assimilated. Now comes an almost equally important fact; and it is this, — a very large proportion of these mineral constituents of the plant passes through the animals, and is found in their excrements.

When corn is preserved by Ensilage, all of these valuable mineral elements are in condition, when applied in the manure to the next crop, to be immediately taken up and assimilated by the growing plants. What an immense saving is here! When corn-fodder is cured by desiccation, many of the leaves, that part of the plant which is richest in mineral matter, are lost, being blown by the winds into the fence-corners, and other out-of-the-way places where their mineral wealth is wasted. The stalks are not eaten and digested by the

animals, are a nuisance in the manure-pile, and are at least two years in becoming sufficiently decomposed in the field, so that their mineral fertilizing material is in condition for the growing plant to avail itself of.



CHAPTER VIII.

EXPLANATIONS WHY ENSILAGE MUST KEEP.

MANY farmers and others came to see the process of filling the Silo with the green corn-fodder; nearly all declared that it would spoil, mould, heat, and rot. Several said, "I guess you will have a fine lot of manure before winter." I replied, "Gentlemen, it will not spoil at all; it will not even heat: it will come out just as good feeding stuff as it is now, and I think better."

None of them believed a word I said, it was plain to be seen. They were certain that this last of my "new-fangled notions" would prove a complete failure, and they would have the laugh on me this time. Some endeavored to cheer me up by saying that "even if it did not work well for the purpose I intended, the Silos would be a capital place to store fruit in, so that it won't be *all* loss, any way."

This kind of talk had been going on for several days, and was, I confess, getting to be rather monotonous. One day a number of well-meaning but incredulous neighboring farmers were present. They knew nothing of agricultural chemistry, or the philosophy of its preservation; but I made up my mind I would convince them that the green corn-fodder would *keep* instead of rotting: therefore I said, "You think it will heat and spoil, do

you?" — "Yes, I am afraid it will," said they each and all." — "Now, I tell you it won't do any such thing." "Why won't it? what makes you think so?" they asked. I knew that I might quote M. Goffart, and all the agricultural scientists in the world to them till doomsday, and it would have no impression on their minds, so I took homely illustrations. Said I, "Why doesn't a pile of horse-manure heat when it is left in the stable all winter under the feet of the horses, until it gets three or four feet deep? Why doesn't sheep-manure heat when it is left all winter in the sheep-folds, and becomes a foot and a half to two feet deep?" — "Because it is *trod down* so solid, the air can't get into it." — "Just so! that is the reason this corn-fodder won't heat and spoil: it is 'trod down' so solid that the air cannot get into it," I rejoined. This was rather a staggerer. "Is there any thing which is quicker to heat when it has a chance than horse or sheep manure?" I asked. "No-o-o," they reluctantly admitted. "Now see here," said I: "haven't you all noticed in the spring, when you were getting out your hog-manure, that you often came across, in the bottom of the yards, buried under the manure, potato-vines and weeds which had been thrown in to the hogs the fall before, that were just as green and fresh as when they were first pulled out of the ground?"* They all replied, "Yes, we have."

BILLERICA, April 27, 1880.

* MY GOOD DOCTOR,—According to request I send you an account of the finding of a fresh and perfectly preserved lily-pad, six or seven feet below the surface of one of our Concord-river meadows. It was in perfect shape, and as green and healthy-looking as in its prime of life. Having a love for geological researches, and thinking these meadows had some time been deposited by the river, I concluded to make an examination. At the top I found a foot in depth of black meadow soil; then, next below, another foot in depth of diatomaceous deposit of microscopic shells, composed entirely of pure silex, so small that they make a good silver-polish. I then came to a pure vegetable deposit, consisting of sticks and leaves, four feet deep. At the bottom of this I found green and well-preserved lily-pads, clam-shells, char-

“Well,” said I, “my Ensilage will keep just the same way. I trample it down solid as it is put in the Silos, cover it with rye-straw, then floor it over with plank, and put about a foot in depth of cobble-stones or bowlders which will press it down solid as a cider-cheese. No air can then get in. The air and gases already in will be continually being forced out by the weight. Therefore it cannot heat any more than the horse and sheep manure can when it is trodden down compactly.” They were silenced.

Pretty soon one old farmer who has got a great deal of good, hard, sound sense in his head, slowly looked round, and still more deliberately said, “By Horn, I’ve changed my mind! I believe it will keep. But you will have to feed it all out before the weather begins to get warm in the spring, won’t you?” — “No,” I replied: “the outside temperature has nothing to do with its keeping. Won’t a pile of horse or sheep manure ‘heat’ and ‘burn’ if it lies up loose so that the air can get at it in the winter, be it ever so cold, just as badly as in the hottest days of summer?”

“Well, there ain’t much difference,” said he. “Now, it is just the same with Ensilage,” I replied. “If it does not ‘heat’ in the winter, it will not in the summer. It is the presence of air, or rather of the oxygen in the air, which causes manure or any damp mass of organic matter to ferment or decay.” — “Well,” said he, as he started for his team, “as I said afore, I believe it will come out all right.” The rest of them said nothing; and whether all of them have found out to this time that it does keep,

coal, and sticks with marks of beaver-teeth, all in a fine state of preservation. These deposits must have been preserved here, perfectly excluded from light and air, for at least a thousand years.

Very respectfully,

DANIEL PARKER, M.D.

or not, I am unable to say. One thing is certain: they were silenced for once.

Now, my explanation why it keeps, and why it is somewhat sour, is this:—

When it is cut ever so fine, and trodden down ever so vigorously, still there is some air left in the little spaces between the pieces of the stalks; and the dried leaves, if there are any, are full of air which has taken the place of the sap which has evaporated. Large stalks, after being cut four-tenths of an inch long, are finer than small ones; which is one reason among several why the corn which grows the largest is the best for Ensilage. The oxygen in this amount of air—be it greater or smaller—immediately starts a fermentation. Fermentation, mould, decay, rot, and fire are all identical. The only difference is in the degree of speed with which the combustion goes on. They all alike depend upon the presence of oxygen, and cease when this active agent of destruction is removed. The process of combustion, whether slow or rapid, consumes oxygen, and gives out carbonic acid gas.

This fermentation consumes the small amount of oxygen which is contained in the mass of Ensilage, and liberates an amount of carbonic acid gas which takes the place of the oxygen. The fermentation in its incipient stage is arrested for want of oxygen. None can get in from the top; for the compression which is constantly going on is all the time forcing the gases out, and where there is ever so slight a flow *out*, none can possibly flow in. Then, as the carbonic acid gas is heavier than the atmosphere, the sides and bottom of the Silo being tight, and as the carbonic acid gas cannot leak out, the air cannot get down into the space occupied by the carbonic acid gas, any more than air can get down into a jug filled

with water or other heavy liquid until the water or other liquid is poured or leaks out. *The Ensilage is thus immersed in a bath of carbonic acid gas.* Fermentation under such circumstances is an impossibility.

CHAPTER IX.

ENSILAGE ADAPTED TO WARM AS WELL AS COLD CLIMATES.

RIGHT here let me reply to an opinion which I saw expressed in a Southern paper which was commenting upon the success which had attended the "Winning-Farm" Ensilage experiment: "We understand Dr. Bailey intends to try the experiment at 'Virginia Stock Farm.' We shall await the result of his trial with a great deal of interest, and hope he will succeed equally well; but we fear that while this system of preserving green forage-crops will doubtless prove of incalculable benefit to the North, we do not think it will answer in as warm a climate as Virginia."

If any of my fellow farmers in Virginia or other Southern States have the same fear, let me call their attention to the fact that the climate of that part of France where M. Goffart has been so successful in preserving fodder by Ensilage is nearly if not quite as warm as Virginia, Kentucky, Tennessee, or Missouri; and also to the reasons given in the preceding chapter. I believe the system is equally applicable wherever the winter's cold or the droughts of summer necessitate the preservation of forage for the food of domestic animals.

The sourness or acidity which is, I believe, always present in a greater or less degree, especially if the

corn is allowed to stand in the field until the ear is fully formed, is far from being an injury: on the contrary, it is probably an advantage. Nearly if not all of our domestic animals gain faster when their food is allowed to stand and ferment until more or less sour before feeding.

This has been demonstrated at the Massachusetts Agricultural College. There all food is chopped and steamed. By actual experiments it was noticed that the animal gained faster, and had a better appetite, when the steamed food was allowed to stand twenty-four hours, at least, to ferment until there was a perceptible degree of sourness, than when fed upon the same food before any such change had taken place.

In regard to swine, every farmer knows that they gain faster upon *sour*, not putrid food, than upon sweet.

The other day a neighbor of mine, a most excellent farmer, called to see Ensilage. He winters about 60 head of cattle. He informed me that several years ago he began to cut his hay and other fodder, and mix his grain with the cut fodder, wetting it thoroughly with boiling water. He found a very considerable gain in so doing. About three years ago he began to mix and wet with boiling water a day's feed for his stock, and let it stand twenty-four hours before feeding, during which time it ferments and becomes quite sour. He informed me that his stock ate it better for the fermentation, and that there is a saving of at least 50 per cent in the amount of hay they required, from the amount they required if fed dry and uncut. His process, doubtless, has somewhat the same effect in facilitating the digestion and assimilation of the starch and other nutritive elements in the fodder as is produced by Ensilaging.

Among the many minor advantages to be gained by

adopting the system of Ensilage is the lessening of the danger from fire. The tramp with his pipe, or the incendiary with his match, would have hard work to raise much of a blaze in a Silo with nothing but Ensilage for fuel.

Another is, the crop can be all planted at one time. Large lands can be ploughed and harrowed, long rows planted admitting the use of agricultural implements to greater advantage, and much less time consumed in turning corners. The work can be not only accomplished in less time, but easier and better.

The dairyman and stock-raiser can systemize their work. They will have all winter to get out their manure, which they can spread broadcast upon the winter rye. They will have no spring's work except to "slick up," repair fences, &c., see to the kitchen and fruit garden. They can now find time to trim their orchards, to graft over trees which bear undesirable fruit, and to put out that "little patch of strawberries," which they have been promising the good wife so long, but which they never before, in the hurry of their spring's work, could get time to attend to.

Then, when all the little jobs that ought to be attended to in the spring are done up, the potatoes planted, and the pleasant days of May have come, the broad fields of waving rye are beginning to show their shining heads, and the time for work is here.

If the farmer I am writing about now, is a worker, and economical, — and he is both, — he has been changing work with his neighbors, helping them get *their* spring's work done; and now they come with their cradles, and in three days the 20 acres of rye are all safely housed. Or, if he has a reaper, — which he has not, — it can be done in one day. No waiting for fair weather: a cloudy day

is just as good as any; even if it rains a little, no need for the work to stop. 'Tis but the work of a couple of hours to replace the plank covering, throw on the bowlders, and the rye Ensilage is saved.

Now comes ploughing-in the rye stubble. Three or four teams make quick work of the 20-acre field. I use the Cassidy sulky plough. It saves not only the labor of holding the plough, but does the work better. Land so hard that it cannot be ploughed with a common plough is turned over without difficulty. It is much easier for the team. You can turn corners quicker, and plough closer to fences. At "Virginia Stock Farm" we averaged with each pair of horses 20 acres per week. For ploughing under weeds or green crops, nothing is equal to it. It is smoothed and fined in one day by a boy and a pair of horses with the Thomas smoothing-harrow. In four days the farmer himself can plant it in drills $3\frac{1}{2}$ feet apart, using one bushel of seed to the acre, with one horse and an Albany planter. Or if he has a Farmer's Favorite grain-drill, with a pair of horses, he can plant it in less than two days, at the same time distributing a little fertilizer in the drill. (This will *pay*, no matter how rich your land is.)

Every farmer ought to have a Farmer's Favorite grain-drill, if he raises 20 acres of Ensilage.

With it he can drill in his rye after his corn is cut, which is better than broadcasting, can save ten bushels of seed, and will have a better crop.

It has two sets of "feed-cups," which make it the best combined grain-drill and corn-planter in the world.

If he thinks he cannot afford the Farmer's Favorite grain-drill, he *must* have an Albany seed-sower and corn-planter.

After his corn is planted, he has nothing to do but

look after his stock, attend to the garden, and live the life an American farmer ought to live. A boy and a pair of horses with the Thomas smoothing-harrow one day in a week will keep the corn free from weeds, the soil completely pulverized, inducing absorption and preventing evaporation, until the corn is a foot high. Then, when it is about waist high, he will want one of Timothy B. Hussey's Centennial improved horse-hoes. With it he can hoe five to seven acres a day better than it can possibly be done by hand, killing and burying up every weed, and throwing just earth enough around the stalks to strengthen them and prevent the wind from breaking them over. Corn is growing very rapidly now, and is very tender, and I think is better for a little hilling. By the way, let me say here that I have a quantity of seed-corn expressly raised for me for Ensilage. I tested it last year on a small scale. I had single stalks which before the tassel was in sight weighed nine pounds; others when fully grown with the grain in the milk weighed over 15 pounds each. I can safely guarantee this corn if planted upon good corn land, in good condition well manured, with proper cultivation to produce from 40 to 75 tons to the acre of green fodder *just right for Ensilage*. The stalk is extremely sweet and succulent; some of them being over six inches in circumference and 14 feet high, with an immense amount of long, broad leaves, some of which measured four feet ten inches in length, and 6½ inches in width. It will not require more than half a bushel to plant an acre (of other kinds one bushel is needed); so that, although it is somewhat high-priced by the pound or bushel, it does not cost so very much more by the acre. It should be planted in drills four feet apart, with the stalks six to eight inches apart in the rows. Be sure and not get it too thick,

for it throws out a great number of suckers, and to yield a large crop must have room and air. I will send sample bags of this Mammoth Ensilage corn by mail, containing one pound, on receipt of 60 cents; three pounds, \$1.50; by express or freight, half a peck, \$1.25; one peck, \$2.00; half a bushel, \$3.00; one bushel, \$5.00; two bushels or more, \$4.00 per bushel. No charge for bags.

It is a waste of time to plant common sweet corn. None of it is as sweet as this Ensilage corn, nor as nutritious, and it will not yield one-third as much; besides it is much easier to cut up a ton of large stalks than a ton of small ones. It is just as easy to cut with the cutter, easier to feed into the cutter, and, when cut, the disks split into small pieces, so that the Ensilage is as fine as if the stalks were small, and packs closer in the Silo. There is every advantage in growing the Mammoth Ensilage corn.

Now I want to say something about fodder-cutters. We must have a self-feeding machine, which will cut or *shred* (which would be better, as it would pack closer, thereby excluding the air more completely) at least sixty tons per day without any labor on the part of the men tending it, except that required to throw the fodder in armfuls upon the apron of the machine.

I think I have found it in Baldwin's Improved American fodder-cutter. I shall try it this spring when I Ensilage my rye, and, if satisfactory upon trial, will in a second edition (if one is called for) tell you all about it. One thing I will say now: a cutter which has but one feed-roller will *not* answer. There must be two rollers, the top one fluted, the bottom roller smooth, between which the fodder must pass. The top roller must be geared to rise and fall, to adjust itself so that a large or

small amount of fodder will be fed with the same speed and regularity.

Baldwin's fodder-cutter I believe to be the best *cutting* machine for Ensilaging purposes on the market.

I think tearing or shredding the stalks would be much better than cutting. The fodder shredded must pack closer, thereby giving less room for air. I have invented, and am perfecting, a machine which will cut *and* shred fodder of all kinds, with the expenditure of one-half the power all other machines I have seen require to do the same work. I utilize a principle never before made use of in fodder-cutters. I hope to have it completed, and be able to furnish it in season for the Ensilaging of the corn. To successfully preserve green fodder, three things are essential: first, that the fodder shall be in as fine a condition as possible so as to compact; second, that the Silos shall be air and water tight on the sides and bottom; third, that sufficient weight shall be placed upon it in order to press out all or nearly all of the air. If the air can be all forced out, there will be *no* fermentation, and the Ensilage will keep indefinitely in the same condition as when put into the Silo. In that case, in order to receive the full benefit of the system of Ensilage, it will be necessary to pile up the Ensilage upon the stable floor twelve to twenty-four hours, until active fermentation takes place, before feeding, that the benefits of fermentation may be secured as explained in the following chapter.

CHAPTER X.

A NEW DISCOVERY.

DURING my investigations and experiments it occurred to me that it would be a great improvement to mix the concentrated nitrogenous grain, such as the refuse from flour-mills, wheat, rye, or buckwheat bran, shorts or middlings, the refuse grains and feeding-stuff from breweries, or prepared animal food from fish and meat scraps, such as Bowker's animal meal, fish-scrap prepared by Goodale's process or otherwise, with the green corn-stalks or other forage crops *at the time of Ensilaging*.

For while the Ensilaging of green corn, rye, and other succulent forage-crops is an immense advance over the old system of curing forage-crops by desiccation, and while such *Ensilage* is a most excellent and succulent food for all domestic animals, still it is by no means a perfect food, being deficient in albuminoids: therefore it is necessary to add to the ration of Ensilage a certain amount of concentrated nitrogenous food in the form of grain, or animal-scrap-meal, or other concentrated cattle foods containing albuminoids to excess.

Animals fed exclusively upon Ensilaged corn will become fat, dull, heavy, and lymphatic, the nervous and muscular systems not receiving that degree of nutrition which they require for their full development.

Starch, the chief nutritive element in corn and other carbonaceous plants, is almost identical in its chemical constituents with sugar. But it is difficult to digest by reason of the toughness of the envelope which encloses the starch-cell.

The gastric juice of the stomach being able to dissolve but a part of them, the remainder passes from the animal in its excrement, and is lost.

The softening and fermentive process through which the Ensilage passes in the Silo bursts the starch-cells, and converts the starch into sugar, as is evinced by the strong odor of alcohol which is emitted when the Ensilage is exposed to the action of the oxygen in the atmosphere. The digestion of the Ensilage is thus rendered easier, and its assimilation more perfect.

By mixing the concentrated nitrogenous food with the comminuted forage at the time of Ensilaging, the labor of feeding the concentrated nitrogenous food is reduced to a minimum.

The nitrogenous food is also subjected to the same softening and fermentive process. The carbo-hydrates in it (composed largely of starch) are liberated, and fitted for easy digestion and assimilation. The albuminoids (which contain the nitrogen) are also rendered more digestible and assimilable by this process of maceration and fermentation, which has the same effect substantially upon them as that which is produced by the process of steaming or cooking.

The concentrated food should be added in such amounts that the mixture shall contain the proper comparative amounts of albuminoids and carbo-hydrates which are best adapted to the sustenance and growth of our domestic animals. An addition of about ten per cent of wheat-bran to the corn-fodder would make the

mixture about equal to the best clover hay, and would be admirably adapted for milch-cows, young and growing cattle, and colts. It is also excellent for breeding-ewes, and for swine nothing could be better.

The great importance of this *new discovery*, both in the saving of labor and increasing the nutritive value of the concentrated food over that which it has when fed in a dry and raw state, and the fear that some avaricious person might take out letters-patent upon the process, and seek to prevent the full benefits of this great and *improved* system of Ensilage from being adopted, by exorbitant claims for royalty, has induced me to make application for a patent upon the process of mixing concentrated nitrogenous cattle-foods with the comminuted green corn, rye, or other succulent forage *at the time of Ensilaging the same*, in such proportions as shall give to the mixture the proper amounts of albuminoids and carbo-hydrates which are best adapted to the growth and subsistence of our domestic animals. Besides the labor saved in feeding (at least \$1.50 for each ton of grain), and the increased value by facilitating digestion (fully ten per cent), is the certainty that each animal will get its ration, and no more. No heedless stable-boy will empty two measures of grain into one cow's manger, and give none to the next, thereby depriving one of the necessary food, and impairing the digestion of the other by an overfeed.

CHAPTER XI.

FOOD INGREDIENTS. — CHEMICAL TERMS EXPLAINED.

WATER. — If a piece of wood or wisp of hay be dried some time in a hot oven, more or less water will be driven off. The water in feeding-stuffs varies from 80 to 90 pounds in every 100 pounds of young grass or fodder-corn, to only 8 or 10 pounds to the 100 in dry straw or hay.

ORGANIC SUBSTANCE. — If the dried wood or hay be burned, most of it will pass off as gas, vapor, or smoke. The part thus burned away is the organic substance. The residue : —

THE ASH contains the mineral matters, that is, the potash, lime, phosphoric acid, &c., of the plant. The most important part for our present purpose is the organic, the combustible matter. This consists of three kinds of ingredients, albuminoids, carbo-hydrates, and fats. The main point in economical feeding is to secure the right proportions of these at the lowest cost.

ALBUMINOIDS — also called protein compounds, proteids, and flesh-formers — contain carbon, oxygen, hydrogen and nitrogen. Thus they differ from the carbo-hydrates and fats, which contain no nitrogen. The name albuminoids comes from albumen, which we know very well as the whites of eggs, and it is found in milk. The fibrin of bone and muscle (lean meat) and the casein (curd) of milk are also albuminoids. Indeed, the solid part of blood, nerves, lean meat, gristle, skin, &c., consist chiefly of albuminoids. In plants they are equally important ; plant albumen occurs in nearly all vegetable juices, especially in potatoes and wheat, casein or legumin in beans and peas, and fibrin in the gluten of wheat, the basis of what farmer-boys call "wheat gum." Clover, bran, beans, peas, oil-cake, and flesh and meat-scrap are rich in albuminoids.

CARBO-HYDRATES consist of carbon and hydrogen. The most important are starch, sugar, and cellulose (woody fibre). They make up a

larger part of the solids of plants, but only a little of them is stored in the animal body. Potatoes, wheat, poor hay, straw, and cornstalks consist largely of carbo-hydrates.

FATS have more carbon than carbo-hydrates, and like them have no nitrogen. Fat meat, tallow, lard, fish-oil, the fat (butter) of milk, and linseed oil are familiar examples of fats. Indian corn, oil-cake, cottonseed and linseed, are rich in fatty matters." [The last three are also rich in albuminoids.] — *From American Agriculturist, January, 1879.*

CHAPTER XII.

CAPACITY OF SILOS.

A CUBIC foot of Ensilage weighs from 40 to 50 pounds; a daily ration for a cow is 50 to 60 pounds: therefore it is only necessary to allow one-and-one-half cubic feet for each cow daily, to tell how large a Silo is wanted. First let the stock-raiser or dairyman decide how many head of stock he wants to keep: the number he *has* kept will be no criterion.

“Winning Farm” three years ago could keep but six head of cows and one horse: now 35 cattle, 5 horses, and 125 sheep are kept, and there is every probability of doubling the number next season. One cubic foot will keep a sheep a week in good condition. According to the rule laid down above, it will require $547\frac{1}{2}$ cubic feet of Ensilage to keep one cow one year. To keep two cows, a Silo is required ten feet wide, ten feet long, and ten feet deep. This would hold about twenty-five tons, and could be grown upon one-half acre of rich, warm land. For four cows it should be built twice as long. It will only be necessary to have your Silos contain 550 cubic feet for each cow's subsistence for twelve months. If the cows are pastured six months of the year, then 275 cubic feet of Ensilage will be sufficient for each cow. It is very important that the sides should be perpendicular, and smoothly plastered with a cement-plaster, so that the Ensilage will settle evenly, and in

order that the plank covering may have nothing to catch upon as it settles under the heavy weights placed upon it.

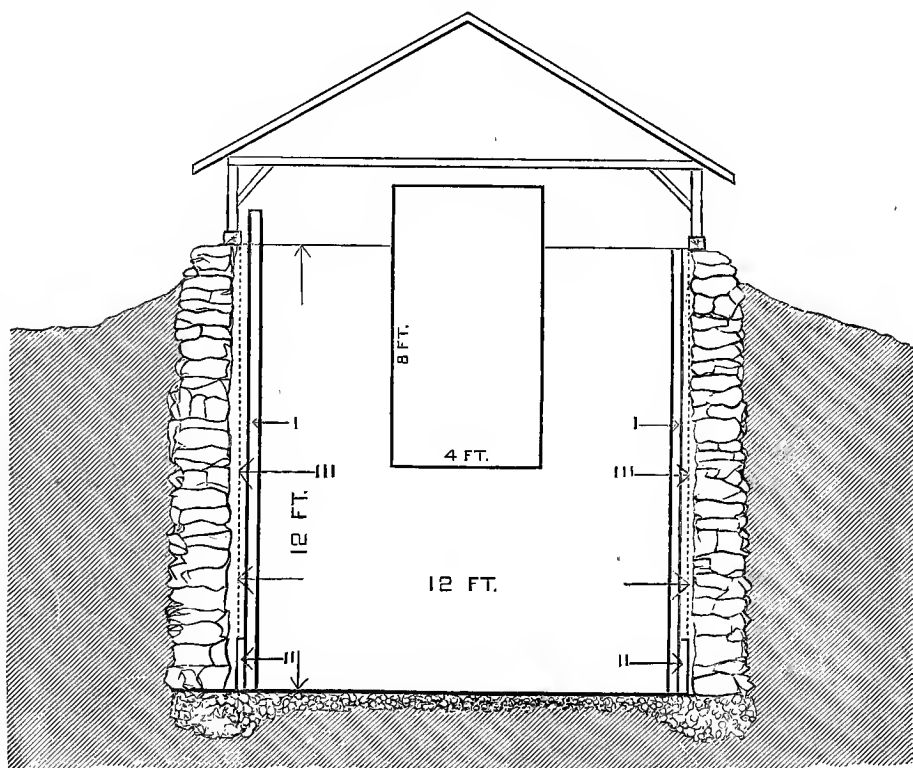
Small Silos, capable of holding enough Ensilage for ten to twenty cows, can be constructed by digging and walling up, as for a cellar, when stone is plenty. Mix one part cement with two parts sand, and make a concrete floor about one inch thick. Put a cheap battened roof over it to keep the rain and snow out, and you have just as good a Silo as any. One 12 feet wide, 30 feet long, and 12 feet deep, would not cost, besides the labor, over fifty dollars, and would hold enough Ensilage to winter 12 to 15 cows, or about 175,000 pounds, or 87½ tons. (See cut on opposite page.) This can easily be produced upon two acres of suitable land properly prepared.

Two feet in depth daily is fast enough to fill the Silo. This rate is better than to fill faster; as the Ensilage will settle better, and there will be less space lost by settling at the top of the Silos. If an accident to cutter or power, or if any untoward incident, stops the filling of the Silo for one, two, or even three days when it is partly full, no injury will be done to the Ensilage, providing one or two men (according to size of Silo) are kept constantly trampling upon it, so as to keep the Ensilage compact. If it begins to dry or heat on top, take a garden watering-pot and sprinkle over it to supply the loss from evaporation.

Two small Silos are better than one large one of the capacity of both; for, with two, one will be empty in the summer, ready to receive rye, clover, or other green forage, which it will be as advantageous to preserve by Ensilage as it is the green corn in the fall.

After the Ensilage is compacted so that it ceases to settle, it is ready to feed out. This takes about a

month. At any time after it is compacted, the weights can be removed, the plank taken up, the straw raked off, and more green fodder of any kind put on top of that which is in the Silo, thereby utilizing all the space. If more fodder be raised than the Silo will hold, the walls can be carried up about two feet with plank, and filled so that when settled the Ensilage will fill the Silo to the top of the masonry walls.



Sectional view of Silo, 12 feet wide, 12 feet high, and 24 or 30 feet long; capacity, 80 to 100 tons of Ensilage, sufficient to winter fifteen to twenty cows; cost, exclusive of labor, about \$40, where stone are plenty.

I, I, three-inch by four-inch scantling.

II, II, one-and-a-half-inch by twelve-inch plank, between which and the rough wall a concrete or grout is poured.

III, III, dotted line showing the face of the concrete pointing and plastering.

CHAPTER XIII.

ENSILAGE IN THE GREAT DAIRY DISTRICTS.

THE system of Ensilage is especially adapted to the great dairy districts of the West. *Improved* Ensilage will enable the dairyman to make as good an article of butter in the winter as in summer. By it the number of cows can be tripled. It is cheaper to soil cows during the summer than to pasture them where land is valuable, particularly in the vicinity of cities. Fifty cents per week is the average price paid in my section for pasturing a cow; for less than this, a cow can be kept upon Ensilage, and in better condition than the average pasture will keep her: besides, by this system, all the manure can be saved, which will abundantly pay for all the extra labor of caring for the stock, if the labor is greater than in pasturing, which I much doubt.

The system of Ensilage — which I hope to see rapidly adopted (of the hundreds of farmers who have visited "*Winning Farm*," nearly all have assured me that they shall build Silos this season) — will cause our exports of beef and mutton to be immensely increased, while the exports of dairy products will be doubled and tripled.

They are *now* rapidly increasing, as is shown by the following table of receipts and exports of butter alone, at New York, for the years 1874 to 1879: —

	RECEIPTS.	EXPORTS.
	Packages.	Pounds.
1874	994,430	4,695,111
1875	1,080,899	4,216,548
1876	1,292,577	10,045,434
1877	1,269,759	19,686,447
1878	1,277,863	23,029,732
1879	1,581,825	36,153,444

The exports of cheese are fully as important, and of so fine a quality that the English and European dairy farmers are in despair as to the future.

By Ensilage, wool can be produced so cheaply and in such quantities as to preclude the possibility of importation.

Ensilage being so rich in carbo-hydrates, it is especially adapted to the growth of wool. If, in connection with Ensilage, we would feed the cotton-seed raised in the South (no better food can be imagined than Ensilage and cotton-seed meal), we could not only stop the importation of wool, but have wool as well as choice mutton in almost unlimited quantities to export (see chapter on sheep for weights of lambs): their mothers being fed upon Ensilage, numberless flocks could be kept. The old pastures, which have become so worthless by being stocked with cows so long, would, if pastured with sheep, speedily improve, and soon be restored to their original fertility.

In the rich and fertile West, Ensilage of corn can be raised and stored in Silos for one dollar per ton: as two tons are equal to one ton of the best hay, this places the comparative value of hay at two dollars per ton; this is less than hay can be cured for. Two acres of *good* meadow are required to keep one cow; while by the system of Ensilage — improved by my process — *eight* cows may be kept in high condition upon the same land.

No country is so well adapted by reason of both soil and climate as our own for the growth of the corn-plant. Now that we know how to utilize this greatest gift of Nature, and save all its valuable constituents instead of a part only, who is able to correctly estimate the blessings which will follow when this knowledge is universally diffused and profited by?

THE CORN-SONG.

BY JOHN G. WHITTIER.

HEAP high the farmer's wintry hoard ! heap high the golden corn !
No richer gift has Autumn poured from out her lavish horn.
Let other lands exulting glean the apple from the pine,
The orange from its glossy green, the cluster from the vine.
We better love the hardy gift our rugged vales bestow,
To cheer us when the storm shall drift our harvest-fields with snow.
Through vales of grass and meads of flowers, our ploughs their furrows made,
While on the hills the sun and showers of changeful April played.
We dropped the seed o'er hill and plain, beneath the sun of May,
And frightened from our sprouting grain the robber crows away.
All through the long bright days of June its leaves grew green and fair,
And waved in hot midsummer's noon its soft and yellow hair.
And now with autumn's moonlit eves, its harvest-time has come ;
We pluck away the frosted leaves, and bear the treasure home.
There, richer than the fabled gift Apollo showered of old,
Fair hands the broken grain shall sift, and knead its meal of gold.
Let vapid idlers loll in silk around their costly board :
Give us the bowl of samp and milk, by homespun beauty poured !
Where'er the wide old kitchen-hearth sends up its smoky curls,
Who will not thank the kindly earth, and bless our farmer-girls !
Then shame on all the proud and vain, whose folly laughs to scorn
The blessing of our hardy grain, our wealth of golden corn !
Let earth withhold her goodly root, let mildew blight the rye,
Give to the worm the orchard's fruit, — the wheat-field to the fly ;
But let the good old crop adorn the hills our fathers trod :
Still let us, for his golden corn, send up our thanks to God !

CHAPTER XIV.

HISTORY OF MAIZE, OR INDIAN CORN.

By E. Lewis Sturtevant, M.D.

THE corn-plant is only known as a cultivated plant. When Columbus first reached the shores of the West Indies in 1492, he found *mahiz* grown and used by the Indians, and also in Yucatan upon its discovery in 1502. While Cabeza de Vaca was toiling his intermittent way from Florida to the Pacific coast in 1528 to 1536, he found maize grown in large fields, and stored in cribs, by the natives of those regions. Cortez had previously found maize in Mexico, at the period of the invasion, and at Cempoalla, in 1519, had eaten maize made into bread-cakes, and on the march to Mexico passed amidst flourishing fields of maize. When De Soto invaded Florida in 1539, *maes* occurred everywhere in large fields; and the same year Marco de Vica found maize growing in New Mexico in fields. In 1540 Vasquez de Coronado mentions fields of maize in the valley of San Miguel and also in store at Cibola; and it is also mentioned in Castanedo's Relations for the same date. Alarcon, in 1540, found it growing in his journey up the Colorado River, and Antonio de Espips in 1583 found it under cultivation by the Concho Indians of this region.

When Cartier visited Hochelaga, now Montreal, in 1535, that town was situated in the midst of extensive corn-fields. In 1586 Heriot refers to maize cultivated in Virginia, and called by the natives "*pagatour*;" and John Smith in 1606 describes the Indian method of culture then. Champlain in 1605 found it growing in fields all along the New-England coast, and describes the manner of its culture. Our Puritan fathers found it in store upon their first expedition of discovery, and speak of the deserted corn-fields, for the time was winter. The Five Nations, in 1603, made corn-planting their business before the French arrived in Canada. The Iroquois raised it in such large quantities that in the invasion into the country of the Senecas, in 1687, some 1,200,000 bushels were destroyed. The Indians of Illinois cultivated corn when the country was first described by Marquette in 1673, by Allouez in 1676, and Membre in 1679. In Louisiana they had even invented a hoe for its culture.

This list might be indefinitely extended; for so universal was the use of maize by the aborigines, that its mention is to be found in nearly all the early chroniclers, and it seems never to have been grown as a luxury simply, but rather as a source of supply, and as a staple food. In the southern country, it was so largely grown that many tribes may be considered as agriculturists, rather than as hunters; in the northern countries it shared with the products of the chase the claims of a sustenance. Its merits, too, were quickly recognized by Europeans, and it soon found introduction to Europe, and a wide distribution. It had a strong agency in the settlement of this country, as it afforded relief from starvation to the "Conquistors" in the South, and to plain Miles Standish and his contemporaries in the North.

The Indian made his conquest the more easy by feeding his invaders from the produce of his corn-field, and the parched grain supported him again in his defence. Among the more imaginative Indians of the South, maize became an object of worship, and a means of conferring honor: it formed portions for gifts, and in one instance was poured upon the ground for the trampling of the horses, as an earnest of welcome to the Spaniard. Everywhere the grain supplied food, in many places was parted into a drink, and the leaves and stalks were crushed to secure the juice to be boiled into a sirup or sugar, and the stalks were used to form bags and other material of wigwam use. It is passing strange that the corn-plant does not appear upon the coat of arms of any of the States whose early necessities it relieved.

In all the references to corn that we find for North America, we find no reference to the amount of crop harvested from a given area; and this seems at first surprising. We read of manuring and fallowing, of the preparation of the ground, of the planting, of the culture, and the storing of the crop. We have some few accounts of varieties, and frequent mention of the uses and modes of preparation. In 1608 the settlers of Jamestown were taught the manner of growing it by the Indians; and in 1621 Squanto, the good-natured Indian friend of the Pilgrims, taught them; and, strangely enough, until quite recently there has been but little change from the Indian methods; and throughout New England generally the cultivation which sufficed the barbarous Indian and the colonist of limited means is deemed by many to be proper now, except the plough has taken the place of the sharpened bough or the shoulder-blade of the moose, the hoe has replaced the

clam-shell, the dung-hill is called upon oftener than is the sea or the stream for its fish. We now store in cribs, rather than in the sacks of our instructors buried in the sand ; yet the Southern Indian had cribs, even as we have now.

It is a valuable reflection this, the antiquity of the cultivation of the corn, and the little progress in the method of its culture which civilization has been enabled to add. It is worthy of thought, this paradox, that in this one case civilization is instructed by barbarism, instead of instructing. Did the Indian attain perfection, or is it ourselves who are satisfied not to progress ? This latter question seems the true one : for the Western farmer has departed from the Indian ways, and meets a greater success ; the progressive farmer here and there in New England has left the track beaten for him by custom, and finds his gain. Yes, it is a fact, the cultivation by the red man was sufficient for him with his resources, but is far from satisfactory for us with our resources. It is time we should follow in the line of civilization, even if we would not be in the van ; and it is folly for us to longer continue in the line traced by barbarians, rather than by an educated experience.

WAUSHAKUM FARM, SOUTH FRAMINGHAM, MASS.

THE IDLENOT PAPERS.

CHAPTER XV.

COST OF PRODUCING MILK ONE CENT A QUART, OF BUTTER TEN CENTS PER POUND, AND OF PORK THREE CENTS PER POUND, BEEF FOR FOUR CENTS A POUND, AND MUTTON FOR NOTHING, IF WOOL IS THIRTY CENTS A POUND.

AT Winning Farm I have by careful tests demonstrated that milk can be produced for one cent a quart, and a clear though small profit made. More than twice as much profit can be made by converting the milk into butter, even though the butter is sold for ten cents a pound, providing the skim-milk is fed to improved breeds of swine. For producing pork with skim-milk and grass, no breed is equal to the well-bred Berkshire. I will as briefly as possible tell how milk can be produced for one cent a quart, then show how much more can be made by converting the cream of the milk into butter, and finally how the greatest amount of pork can be raised from the skim-milk.

To begin with, we will assume that a farmer has a good farm of 50 acres, with a comfortable house and a barn 36 by 48 feet. This barn will hold not far from 25

tons of hay and the corn-stalks and butts from about two acres of corn. It will probably have a lintel for cows on one side of the "floor," a granary and harness-room, two or three horse-stalls, and hay-mows on the other side. Upon such a farm—if it is a good one—there can be kept two horses and 10 to 15 cows upon hay and grain, providing a partial system of soiling is adopted to help out the pasturage during July, August, and September.

To carry on this farm, even though the farmer be ever so much of a worker, he will have to keep one good hired man at least nine months of the year; the entire resources of the whole farm will have to be devoted to the subsistence of the 10 or 15 cows; all the other crops—vegetables, fruit, &c.—will not bring in more cash than the grain fed to the cows in addition to that raised upon the farm will cost. Now, we will assume that each of the 15 cows will produce 2,000 quarts of milk, besides that used by the farmer's family: this, if sold for three cents a quart, gives \$60 as the gross income from each cow; that makes the total income from the 15 cows, \$900. This, I think, is as good a showing as our best farmers can exhibit.

Against this income of \$900, there must be charged the interest and taxes upon the farm, and other expenses as follows:—

6 per cent on \$5,000, value of farm	\$300 00
Repairs on buildings, $2\frac{1}{2}$ per cent on \$2,000.	50 00
Taxes on farm, \$40; taxes on stock, \$10	50 00
Interest on stock and farming tools	90 00
Wages and board of hired man 9 months, at \$30	270 00
Depreciation on stock and farming tools, value \$1,500, 10 per cent	150 00
<i>Carried forward</i>	<u>\$910 00</u>

<i>Brought forward</i>	\$910 00
Wages of the farmer, besides house-rent, fuel, and produce raised on the farm consumed by himself and family . . .	400 00
(This may seem high, but I would like to hire the man and his family I am writing about for the same wages and other consideration mentioned.)	
Total expense	<u>\$1,310 00</u>
Total income	<u>900 00</u>
Deficiency	\$410 00

In other words, the farmer who owns a 50-acre farm worth \$5,000, with stock and farming-tools worth \$1,500, who keeps 15 cows and sells \$900 worth of milk from them yearly, if he keep a correct account of expenses, instead of receiving \$400 for the services of himself and family, actually works for nothing except house-rent and fuel and vegetables, and pays \$10 per year for the privilege of doing so.

It must be confessed that this is not very encouraging ; and it is no wonder that the boys want to leave the farm, and the girls declare that " they won't marry a farmer."

If my figures are incorrect, I hope some enterprising and industrious farmer will show how much better his actual results are. Let us have all the items of both expense and income.

Now, there is a chance to take a "new departure," which will change all this ; and I propose in this and subsequent letters to show how it can be done. Under the new dispensation, which we will call the "Book of Ensilage," Sylvester Idlenot starts with the same 50-acre farm, divided into 20 acres arable land, 20 acres pasture, and 10 acres in wood, all well fenced, and valued at \$5,000. Time, March 1. He has used plenty of muck and road dust for absorbents, so that he will have two cords of good manure for each animal, 32 cords in all.

A few days ago I called on Sylvester, who is a neighbor of mine, in whom I have taken a great deal of interest. At first I was interested because I saw he was always at work. His motto, like his name, was "Idlenot." From his dropping the final *t* when pronouncing his name, I think he is of French descent; probably a "Limerick Frenchman." Upon further acquaintance I found he had rare good sense. I found him studying over his farm-account for the year past. From the expression upon his countenance I saw he was not satisfied with the results. "Good-morning, Sylvester," said I. "Ah! good morning to yoursilf. It's glad I am to see ye, dochter: 'tis puzzled intirely I am. Perhaps ye can explain the botheration, so that Mary and mesilf can see through it."—"I'll try, Sylvester. What is it?" I asked.

"Well, dochter, 'tis just this: Me and Mary has been married fifteen years this very blessed first day of March. When we were married I had saved up \$750, and Mary had \$250, just \$1,000 betwixt us. Well, Mary, God bless her, she kept right on at work, and she laid up a little over \$100 a year. I kept right on at work too, and laid up me whole wages. (I received \$300 a year and me board.) I clothed mesilf with what I earned doing extras and warrking nights for me master's neighbors. This made our savings \$400 a year. In tin years we had saved up, with what we had when we married, \$5,000, and the interest made it some over \$7,000. Well, we got tired of working for other people, and thought we would have a home of our own: so we bought this farm, and the stock and the tools and all the fixings were all paid for. We had a few hundred dollars left.

"Well, now, I have just been figuring up the last year,

and it stands this away: We have sold milk amounting to \$900. The fruit and vegetables and chickens and eggs have come to just enough to balance the mate, the grocery, and the grain bill. As the incomes and the outgoes are of a bigness we'll let them go together, and say no more about them. When I had got this far without stopping to think, I said, 'Mary, the milk-money is all clear gain;' Mary says to me, 'I don't see it: where is the money?' I began to think again; says I, "there is the \$7,000 in the farm. The year before we bought it we got \$420 intrust, that we would have had if we had had no farm, so that is no profit belonging to the farm; take that from the \$900, and there is only \$480 left. Thin there was the wagis of one hired man, \$15 a month and board worth \$10 a month, that for nine months is \$225, that laves only \$255; thin there is the taxes, \$60, the insurance, \$10, thin the depreciaction in the stock and farming-tools, tin per cent on \$1,500, — \$150; thin the repairs on the buildings, 2½ per cent on \$2,000, — \$50, making \$270. Taking that out of \$255, all that was left of the milk money, and I find mesilf in debt to mesilf \$15, and nary a cint of wagis for Mary or mesilf. 'Mary,' says I, 'we have been working hard as iver we could work the whole year for our board, and have paid \$15 for the privilege, and clothed oursilves. All the year we have been working hard arning our *own* intrust money, and giving \$15 for the right to do it.' Now, docther, what I wants to know is this: ain't there no way for a farmer to do, 'cepting to work for nothing and clothe himself?" I was very much amused while Sylvester was explaining his figures, and wondered how many farmers there are who have kept as accurate an account as he has, and could tell whether they were making any thing or were really working for nothing.

I finally said, "Sylvester, I will tell you how to manage your farm and stock so as to receive good wages for yourself and also for Mary, and something as a profit. How much ready money have you saved up now?" — "Well," says he, "we have a bit over \$2,000; we have each year saved up just about what the interest would be, and worked for our board ever since we bought the farm, bad luck! but it's a good farm too."

"Well, Sylvester, in the first place, you must buy fifty cords of good manure, that will cost you at the railroad-station \$6.50 per cord, — \$325; that will give you 82 cords of manure. Spread that as you haul it broadcast upon 15 acres, that will be about $5\frac{1}{2}$ cords to the acre. After you have got it well spread, come up to my place, and get my Thomas smoothing-harrow, and give it two good harrowings, one each way. The 15 acres will take your ten-acre meadow and the five-acre field where you had potatoes and other vegetables last year: the other five acres, which is the apple-orchard, you can cut the hay early, and then use it as a hog-pasture.

"Now, immediately after harrowing the five-acre field, sow it to spring rye to be fed out green in May. You have now a lintel on one side of your barn which will hold 16 cows; you want to make one on the other side 36 feet long, that will accommodate 12 cows; the other 12 feet will allow for two horse-stalls and a pair of stairs to go up to the granary, which you must move up stairs; this gives you room in your barn for 28 cows and two horses. All the planting you want to do this year is one-half acre of potatoes and a good big kitchen-garden." "Never you mind telling me that," broke in Sylvester. "Go on, docther: I'm listening wid both ears, and so is Mary."

"Now, after you have your manure all out and spread,

the rye sowed, the garden made, and the potatoes planted, you dig a hole into that bank east of your barn, 30 feet wide, and 45 feet long, and about four feet lower than the sills to your barn; wall it up all round, then plaster the walls with concrete, run a wall through the centre, cut off the corners, and carry these concrete walls up above the top of the earth until they are 16 feet high on the inside; then get a carpenter to put a light roof over them to keep the rain and snow out, and you have two Silos which will hold 400 tons of Ensilage, two tons of which is worth more than one ton of timothy hay. You will have to hire some help to build these Silos; and it will take about 125 barrels of cement, besides the labor of yourself and hired hand: you will have to pay out in building them about \$300. Early in May, as soon as
• • your spring rye is eighteen inches high, commence to cut it, and feed it to your cows in the barn; the last week in May cut the grass in the ten-acre lot; as soon as you have got the hay off of it, turn it over, roll it, take my Nishwitz harrow, and harrow it both ways, then plough the rye-field, turning under the stubble and the green second growth. Rye, if cut before heading, grows a second crop. After harrowing that, the same as the sod-land (and, Sylvester, let me right here repeat the old Pennsylvania Dutchman's advice to his son about preparing corn-land: 'Shon! you shust drag and drag and drag until you have him shust right, and den you shust drag him vonce more, and he vill do pretty vell'), I will let you take my Albany corn-planter, and with one horse you can plant the whole 15 acres in three days, at the same time distributing about 100 pounds of Stockbridge corn-manure or some good reliable superphosphate in the drills. I use an equal amount of plaster mixed with the fertilizer. Make the drills about three and a half

feet apart, using from one-half to one bushel of seed-corn to the acre, according to the size it grows. I have a variety, — the Mammoth Ensilage, — which takes only one-half bushel to the acre: the drills want to be four feet apart. It will yield on good corn-land, *well manured*, 40 to 75 tons of green-corn-fodder to the acre: I guess I can furnish you with seed if you want me to. As soon as the corn begins to prick through the ground, you must harrow it all over with the Thomas smoothing-harrow, and follow it up every week or ten days until the corn is a foot high: each harrowing will take one day. When it is about waist high, you want to go through it once with Hussey's Centennial Improved cultivator and horse-hoe; after that the corn will shade the ground so much that there will be no more weeds; when this is done, until your corn is ready to cut, you and your man can change work with your neighbors, helping them in their haying, they to pay you back when you save your corn-fodder: having nothing but the garden to attend to, you will have plenty of time to pay in work for all the help you will need then. About the 1st of September your corn will be in full tassel, which is the time to cut it. You will have to buy you a cutter, which will cost about \$100. You will have to hire a small engine, — three to five horse-power will do, — and a boy who understands how to run it: this will cost about \$25 to \$40. It will take eight men besides yourself to cut the corn-fodder and pack it in the Silos to advantage. It will take about ten days to fill the two Silos. I think you will have enough on your 15 acres to fill them, and have several tons which you will have to shock and cure by drying. When the Silos are filled, you want to put six inches of rye-straw on top of the Ensilage, then lay down on the straw a floor of one and

one-fourth^{inch} spruce plank : on top of this floor put a layer of cobble-stones about a foot deep. As soon as you have done this, plough your corn-land, and sow with winter rye. Sow two bushels to the acre. I will loan you my Cahoon Broadcast seed-sower to sow the rye : with it you can sow the 15 acres in one day, and do it far better than by hand. Harrow it in with the smoothing-harrow, then roll. In the spring, harrow the rye as soon as it begins to grow, and follow it up once a week until it is eight or ten inches high. This harrowing loosens the ground, kills the weeds, and causes the rye to tiller more, thereby increasing the crop from 20 to 50 per cent."

CHAPTER XVI.

SECOND IDLENOT PAPER.

ABOUT two months after my last interview with Sylvester Idlenot, when I advised him to try Ensilage, I saw him coming up the walk to my house, evidently in a botheration. As he opened the office-door I said, "Good-morning, Sylvester. Take a chair. How are Mary and the boys?"

"All well, God bless 'em, I thank ye; but it's in throuble I am intirely!"

"What is the matter, Sylvester?" I asked anxiously.

"Well, dochter, 'tis just this. You know, last March ye happened into my house just as I was figuring up the account for the year, and we had made nothing but shelter and our vittles. Shure, we always had a roof over our heads, and plenty to ate, and comfortable clothes on our backs, and laid up three and four hundred dollars each year, and niver touched the bit of intrust money our savings was arning. After we bought the farm, and since then, divil a cint have we laid up more'n the intrust would have been. Well, you, dochter, told me what to do, and I'm a-doin' it; and now we're ruined intirely!"

This sounded rather ominous; and I said, with more

anxiety than curiosity this time, "Sylvester, what *is* the matter?"

"Dochter, I've been following your directions, for I thought it was sensible; and besides, I'd seen how well your own stock looked that was fed on the insilage; and ses I to Mary, it's thrying it we'll be after doing. So I bought the manure, and I spread it broadcast on the tin-acre field and five-acre lot: the grass 'tis just growing splendid! We sowed the five acres to rye, and up to me shoulder it is, and so thick ye can hardly make your way through it. We are feeding it to the cows, and have been for a while or two."

"Well, don't they do well, and give a good mess of milk?" I asked, interrupting him.

"Niver better, but that ain't the throuble," said he.

"Well, what is it? Tell me, what is the matter, Sylvester?" I asked.

"I'm coming to it, dochter, directly. I'll tell ye immejtitly. I was at warrk on me siloos. I've got 'em more'n half done already. Day before yesterday, whin I looked up, there right forninst me stood the conthtractor! 'So you are going to thry the dochter's new-fangled feed, are ye, Sylvester?' — 'Yes, indade I am,' I said: 'it is tired I am making milk, and selling it to the likes of ye for less than it costs to make it.'

"'I read all about it in the noosepapers,' said he: 'ye's going to make it for a cint a quart. It's foine business ye'll have making milk for a cint a quart and selling it for three;' and he wunk a knowing kind of a wink as he got on to his wagin, and druv away. Ses I to myself, Fhat the divil is that conthtractor winking like that to me for? and thin I thought about the noosepapers telling all about the siloo and the insilage, and at the head of the whole story was, 'How to projuce milk

for one cint a quart ;' and it sthruck me all of a suddint. Ah, dochter, ye's guv us away wid your noosepapers, and ruined the whole business, bad luck to it ! I niver did belave in book-farming, anyhow ! ”

Sylvester wiped the perspiration from his brow, and looked the personification of disgust. “ Why, Sylvester,” I said, “ how can that be ? What harm can there be in writing down our conversation and the advice I gave you, and printing it so that others may profit with us in the advantages which the new system of Ensilage gives ? Surely you are not so selfish that you do not want other farmers to share with us the good times which the general adoption of the new system will bring about ? ”

“ No, no, dochter : it isn't the farmers that I want to kape in the darkness and throuble they are now in, by any manes ; but the milk contrhactors—may the devil fly away wid every mother's son of them ! As soon as they foind out we can make a quart of milk for a cint, not a farden more thin a cint will they pay us for our milk. And that's what's the trouble altogether ! Fhat's the use of all your exparimints ? The contrhactor—bad luck to the likes of 'im—will get the oisther and lave us the shells like he does now. Shure thim's the b'ys fhat makes their foine living by the sweat of ither men's brows ! ”

I laughed at this, and proceeded to finish the advice I gave Sylvester last March. “ Sylvester,” I said, “ you are keeping your cows now on rye. All right : continue to feed the rye to them until the first of June, then turn them into the pasture. By that time there will be plenty of feed which will carry them till fall, with the help of a little grain. In fact, keep them as you would if you were not trying the Ensilage system. Finish your Silos. When you have them filled with the corn Ensilage, put

a lintel on the other side of the barn, and in about a month buy thirteen more cows, and keep them in the barn, turning them out every day an hour or two in the yard to exercise. Feed the Ensilage to them twice a day, about a bushel (25 or 30 pounds) to a feed. The two Silos will hold about four hundred tons; that, with the rye Ensilage, will be sufficient to keep fifty cows the year through, if you give to each cow, in addition to the Ensilage, about four pounds of bran or cotton-seed meal daily while she is in milk."

"But, docther, won't the cows and sheep get tired of the insilage, and need a change sometimes?" asked Sylvester.

"I don't see that there will be any need of a change," I replied; "I have fed cattle upon it exclusively for several months, and they like it better and eat it with greater avidity than ever. It is almost the *same* as fresh pasture grass when bran or cotton-seed meal is fed with it, and is certainly as *good* as fresh pasture, as the cattle can eat their fill without labor. When there is plenty of food in the pastures, no one dreams of offering a *change* to stock. You will have but 28 cows, and that is all I advise you to keep; but, as you have the feed for 22 more, you must build a shed on the south side of the Silo, 24 feet wide and 47 feet long; fence in a yard of about one-quarter of an acre of that high, dry ridge east and south of your Silos, and buy 100 breeding-ewes, common merinos, such as I bought last fall, only you need not bother about their breeding. If they are grades they will answer just as well.

"As I am advising you what to do, I will let you take two of my Cotswold bucks to put with them. If they turn out well, you can pay me for the use of them what you think is right. Now you will want to buy six good

brood-sows (any large breed), and a pure Berkshire boar to use on them. You can keep the 28 cows, the 100 sheep, and the seven hogs on the Ensilage which you will raise on the 15 acres. If the contractor tries to beat down the price of milk, you can make butter, and have the skimmed milk to feed to the pigs. If your cows each give 2,000 quarts of milk per year, you can make 200 pounds at least of butter. The skim-milk, the run of the five-acre orchard (you must ring the hogs when you turn them out to pasture), and Ensilage in the winter, will make you at least 500 pounds of pork to each cow. This will give you \$20 for butter, if you have to sell it at ten cents per pound. 500 pounds pork at three cents per pound is \$15. You will also raise a fine calf worth at least \$10 when a year old. This gives you for each cow \$45, or \$1,260 for the 28 head. Your 100 sheep will shear you seven pounds of wool on an average (my merinos average between nine and ten pounds), worth unwashed at least 30 cents per pound, \$2.10 a head, or \$210 on the whole flock. Then you will raise, by the use of Cotswold bucks, 90 lambs or more, which will be worth when four months old, at least \$4 per head; this is \$360 more. Now let us see: your income will be as follows:—

For butter, 5,600 pounds, at 10 cents . . .	\$560 00
For pork, 14,000 pounds, at 3 cents . . .	420 00
28 yearlings, at \$10 apiece . . .	280 00
700 pounds wool at 30 cents . . .	210 00
90 lambs (Cotswold merinos) at \$4 . . .	360 00
Total	<u>\$1,830 00</u>

“You must in the future, as in the past, make the sales of fruit, eggs, poultry, and vegetables pay the butcher’s and grocer’s bills, so that there will be to

come out of the \$1,830 the following items of expense :—

Interest on farm, value	\$5,000 00	\$300 00
Interest on stock and depreciation on farming- tools, value	1,500 00	150 00
Interest on 13 additional cows, value	520 00	} 111 70
Interest on 100 sheep, "	400 00	
Interest on stock of manure bought, "	325 00	
Interest on Silos, cash paid out, "	300 00	
Interest on sheep-shed, "	150 00	
Total investment	\$8,195 00	
Wages and board of one hired man six months, at \$25		150 00
Repairs on buildings and fences		50 00
Taxes and insurance		80 00
Bran and cotton-seed meal, four pounds daily to each cow when in milk		280 00
Grain for sheep and horses		150 00
Total expense		\$1,271 70

"This leaves for you and Mary \$558.30."

"Fhat! \$558 and 30 cints! besides inthrust and all expinses is it?" asked Sylvester, who had been watching me closely, "and no thanks to the conthtractor; wid butther at tin cints a pound, and pork at three cints a pound, wool at 30 cints a pound, and Cotswold Merriny lambs at \$4 apiece! Shure, that is too low for the lambs anyway. Your lambs, docther, of the same kind, weighed over 100 pounds apiece whin only five months old; for, d'ye moind, I helped ye to weigh them meself."

"That's so," I replied: "they will be worth from \$5 to \$7 each; so will the butter be worth more than ten cents a pound, and the pork be worth more than three cents a pound. I have put the prices low, in order to show you what can be done by the *system of Ensilage*. Now, Sylvester, you and Mary take hold of this as you do of

every thing you undertake ; and, my word for it, you will think you have found the real ‘ philosopher’s stone.’ After you have tried it one year, show me your account. If it is not better than last year, I’ll pay the difference out of my own pocket.”

“ Ye’ll not be called upon to do that, docther,” said Sylvester ; “ and ye can depind upon Mary and me and the b’ys to thry.”

CHAPTER XVII.

ANALYSIS OF ENSILAGE FROM THE "WINNING-FARM" SILOS.

By C. A. Goessmann, Ph.D.,

*Professor of Chemistry, Chemist to the Massachusetts State Board of Agriculture,
and State Inspector of Commercial Fertilizers.*

THE sample of Silo corn (Ensilage) consists of:—

	PER CENT.
Moisture at 212°–220° Fahrenheit . . .	80.70
Dry matter left	19.30
	<hr/>
	100.00

This dry matter consists of:—

	PARTS.
Crude cellulose	6.43
Fat ether abstract	0.62
Albuminoids	1.56
Non-nitrogenous extract matter	8.92
Ash (with traces of sand)	1.77
	<hr/>
	19.30

Also an average analysis of the corn-plant in the milk:—

	PER CENT.
Moisture at 212°–220° Fahrenheit	85.04
Dry matter	14.96
	<hr/>
	100.00

	PARTS.
Ash	0.82
Albuminoids	0.86
Fat	0.26
Crude cellulose	4.53
Non-nitrogenous extractive matter	8.49

By comparing the two tables it will be seen that the Ensilage contains over 29 per cent more dry matter than the whole plant in the milk; over 41 per cent more of crude cellulose; over 138 per cent more of fat; over 81 per cent more albuminoids; over 5 per cent more of non-nitrogenous extract matter; over 115 per cent more ash (or mineral constituents).

It will also be seen that the nutritive ratio of the Ensilage is one part of albuminoids to $6\frac{7}{10}$ parts of non-nitrogenous extractive matter (digestible carbo-hydrates). This makes its nutritive ratio a little better than timothy hay, which is, according to Dr. Wolff, 1 to $8\frac{1}{10}$, but not quite as good as average clover hay, which is 1 to $5\frac{9}{10}$. By this analysis Ensilage would seem to be much nearer a perfect food than I have supposed. If the results of careful experiments in feeding coincide with the above analysis, the system of Ensilage is far more perfect and important than I have even hoped.

I shall institute a series of experiments to test this point; for, however satisfactory a chemical analysis may be, the real touchstone is the *feeding value* demonstrated by careful and repeated experiments.

What farmers want to know is not what an article of food is worth *chemically*, but how much it is worth to *feed to their stock*.

My experiments thus far satisfy me that the value of corn-fodder is doubled by the softening and fermentive process which it undergoes in the Silos; that two tons of

it are worth more to feed than four tons of corn-fodder fresh from the fields, or one ton of best timothy hay.

I received the above analysis the last of April, and at once resolved to test it by experimentation. April 29 I selected two thoroughbred two-year-old Jersey bulls, and weighed them. "Rossmore" weighed 960 pounds, "Hero" weighed 890 pounds. "Rossmore" was fed 40 pounds of Ensilage daily, and *nothing else*. "Hero" was fed 40 pounds of Ensilage and three pounds of wheat-bran daily, and *nothing* more. June 2 I weighed them again, and found that "Rossmore" weighed 960 pounds, having neither gained nor lost; showing, so far as one experiment could, that 40 pounds of Ensilage containing over 80 per cent of water was sufficient to sustain in a healthy condition the functions of the animal system, and replace the waste tissue. His hair was smooth, he appeared to be satisfied, and Sylvester thought he was gaining. "Hero" at this time weighed 943 pounds, being a gain of 53 pounds in 34 days, or $1.55\frac{15}{17}$ pounds daily: as it took the 40 pounds of Ensilage to sustain the animal, it follows, that 102 pounds of wheat-bran, fed with the Ensilage, produced 53 pounds of beef (live weight).

CHAPTER XVIII.

HOW TO PRESERVE GREEN CORN FOR THE TABLE.

DURING my visit at "Linden Grove," the home of T. S. Cooper, the well-known importer of choice, high-class Berkshires and Oxfordshire-down sheep (see portrait of Freeland), upon my describing Ensilage to Mr. and Mrs. Cooper one evening, I was surprised and pleased to learn from Mrs. Cooper that she had been Ensilaging green corn for a long time for her table. I asked her to tell me how she prepared it, and she replied as follows: "I take fresh ears of green sweet corn, cut the corn from the cobs, pack it down solidly in a large stone jar, cover it on the top with about two inches of salt, put a follower on the salt, and weight it. Whenever I wish to prepare some for the table, I soak it until fresh, or change the water in which I boil it as often as necessary. When it is cooked, I drain the water from it by letting it stand in a colander a few minutes, then season to suit; or, after it is nearly done, the water may be drained off, and nice rich milk added, in which let it simmer until ready to serve."

CHAPTER XIX.

MY EXPERIENCE WITH SUGAR-BEETS. — COST OF RAISING ONE-FOURTH OF AN ACRE, AND THE YIELD . . . . .	101

	DEBIT.
Seed	\$1 50
12 bushels wood-ashes	1 80
100 pounds salt	50
2½ cords manure at \$6 per cord	15 00
Ploughing twice	2 00
Cultivating and harrowing	1 00
Raking the ground half a day	50
Planting one-fourth day	25
Weeding and thinning, 4 days	4 00
Harvesting, 2 days	2 00
Total	<hr/> \$28 55

	CREDIT.
252 bushels at 60 lbs. to the bushel, 15,120 lbs. at \$4 per ton	\$30 24
One-half the value of the manure, salt, and ashes left in the ground	8 65
Total	<hr/> \$38 89
Cost	28 55
Profit	<hr/> \$10 34

The piece of land was broken up a year ago last spring, planted that season with potatoes and beans, manured *lightly* in the hill. The beetles ate the potato-vines all up, so that potatoes there were none: the beans bore a very light crop. Before it was broken up, the land produced perhaps half a ton of hay to the acre of fine June grass. This was the first time I ever raised sugar-beets, and the result so well satisfied me that if there were a beet-sugar factory near me I would raise five to ten acres next year. The profit on an acre would be \$41.36, which is

more than any thing else has yielded, except land cultivated by our market-gardeners.

I have no fears but what, by applying $1\frac{1}{4}$ cords of manure to the same piece, I could raise ten to twelve tons another time, for I learned something last season. I had them too thick: the rows were twenty-eight inches apart, and as my men hated to pull up nice plants they left them too close together. Next year I shall plant the rows three feet apart, and thin to twelve inches. I shall not try this piece with $1\frac{1}{4}$ cords of manure, however: I shall put on at least three cords. I raised 225 bushels of long red mangels on one-eighth of an acre, right alongside of the sugar-beets, and on another eighth of an acre side of them 160 bushels of yellow globe mangels. All these pieces were manured alike and cultivated the same.

Now, I want to inquire whether I had better spread about 200 loads of manure on the land I intend to break up next spring, as I get it out next week; or put it in a pile, and spread it in the spring *after* ploughing, the ground being frozen. I cleaned my barn-cellar out in October. The cellar is cemented on the bottom, and the walls pointed with cement. I have made this manure since then. I have thirty-two head of cattle, four horses in the barn and twenty-nine head of swine in the cellar.

I had no idea how much manure I was losing until I cemented the cellar bottom. I have been constantly throwing in dry loam and muck at the rate of one to two loads per day, besides bedding my cattle with sand and the horses with meadow-hay; and now, since the urine of all the animals is saved, the pig-pens which extend under all the stalls and lintels are so wet and soft that the hogs are unable to get from one end to the other.

I feed one hundred pounds of cotton-seed meal, sixty pounds of corn meal, fifty pounds of shorts, and twenty-four quarts of oats daily, besides the food of the swine. I believe that dry muck or loam thoroughly saturated with urine from animals fed as above, and worked up into a perfect mush, is as good to grow crops as the same bulk of solid excrement. Am I right? I should like to know whether I had better spread my manure on the ground, or pile it.

Yours respectfully,

JOHN M. BAILEY.

WINNING FARM, Nov. 1, 1878.

(In American Cultivator.)

From this experiment I am satisfied that sugar-beets can be raised at a profit. The sugar-factories are now

paying five dollars per ton, which would make the profit on my quarter of an acre \$17.90, or at the rate of \$71.60 per acre ; but, in order to realize the greatest profit, the pulp should be returned to the farm, and fed out to the stock thereon. By the system of preserving cattle-food in Silos, this can be done most economically. A small Silo ten feet wide, twenty feet long, and ten feet deep, will hold about sixty tons of pulp. By covering it with a little straw, and upon that a flooring of plank, with weights upon it, the same as in the Silos of corn Ensilage, it may be kept for a long time. The beet-pulp, containing as it does all the nutrition except a part of the sugar, would be an excellent food to feed with the corn Ensilage. It is also a very good article of food for swine by itself.¹

In regard to the manure, I have demonstrated by several careful experiments since the above was written, that the best time and way to apply manure is when you have time, and with a broadcast manure-spreader.

¹ I have learned, since writing the above, that the best way to raise sugar-beets is to have the rows eighteen inches apart, and to thin to nine inches.

CHAPTER XX.

SUMMARY.

To sum up, I will say that large Silos 40 to 50 feet long, 15 to 18 feet wide, and 16 to 24 feet deep, are the cheapest: they will not cost more than one dollar for each ton's capacity. As two tons of Ensilage are worth more than one ton of English or timothy hay, the comparative economy of Ensilage is at once manifest. They require no repairs, and if properly built will last for ages.

The cost, therefore, of storage-room for Ensilage is about six cents per ton yearly. In order to store its equivalent of hay as cheaply, a barn to store a hundred tons of hay would have to be *built for two hundred dollars*. My plans of building Silos are cheaper than to dig pits in the ground. The small pits which are used in France, and described by Charles L. Flint, Secretary State Board of Agriculture, in his last report, would cost much more to construct, the labor of filling and weighting them be much greater.

Since the publication of the last State Agricultural Report, I have had the pleasure of showing my system of Ensilage to Secretary Flint. After critically examining the Silos, the Ensilage, and the stock fed upon it, he declared "that the system of Ensilage would work a perfect revolution in agricultural methods in this country." The system of Ensilage reduces the comparative value

of good timothy hay to four dollars per ton, and of hay-barns to two dollars for each ton's capacity. The labor of feeding is lessened very materially; the health, condition, and appearance of the stock is immeasurably improved. In short, it will bring about, upon its general introduction and adoption, an agricultural millennium — almost.

CHAPTER XXI.

EFFECT OF ALCOHOLIC FERMENTATION IN ENSILAGE UPON "GILT-EDGED BUTTER."

THE following letter was received from a gentleman with whom I have had considerable correspondence upon the subject of "Ensilage."

SODUS, WAYNE COUNTY, N.Y., April 16, 1880.

MR. JOHN M. BAILEY.

Dear Sir, — Yesterday I received a visit from Professor L. B. Arnold, the dairy-writer. The subject of "Ensilage" came up, and its effect on "*gilt-edged butter*," &c. He is very strong of the opinion that the alcoholic fermentation that is begun will injure the fine flavor and texture that is desirable in my trade. I am very anxious to read your book so as to clear up these points; and, if there is any thing further that you can say on the subject, I would be very glad to hear from you.

I haven't got that copy of the paper with your article, "How to produce milk for one cent a quart, butter for ten cents a pound, beef for four cents a pound, and pork for three cents a pound," yet.

Respectfully,

A. J. RICE.

P. S. Just received and read it.

As Professor Arnold is so great an authority, as he is supposed to know every thing concerning dairy matters, it will doubtless be deemed presumptuous in me to say, and attempt to prove, that the learned professor is mistaken. Let us consider through what organs, changes,

and circumstances the small amount of alcohol (which is found in the Ensilage) passes before it can reach the butter.

In the first place, the alcohol is only an *incident* to the great change which has been taking place in the Ensilaged forage. This change, which is so important and so useful, is the conversion of the starch contained in the plants into sugar. The formation of alcohol is only a nutritive barometer which tells us that sugar has been formed. The odor of alcohol is hardly perceptible until after the Ensilage has been exposed to the action of the oxygen of the atmosphere twelve to twenty-four hours.

Therefore, if the professor is correct, it is in the power of the dairyman to prevent the formation of alcohol by feeding direct from the Silo without allowing the alcoholic fermentation to take place. Thus, if an evil, it is easily avoided.

In the second place, the *small* amount of alcohol present in the Ensilage (I have never seen any of my cows intoxicated) is mixed with the saliva during the process of mastication, and passes with the Ensilage into the first stomach, or paunch, thence into the second stomach. It is then re-masticated by chewing the cud, and passes into the third stomach, thence into the fourth stomach, where it is digested.

When cows are fed upon Ensilage, I have noticed that their breath is particularly sweet, as if fed upon the sweetest grasses. From the stomach it passes into the intestines, from which that part of their contents necessary for the nourishment of the animal economy is taken up by two sets of vessels; first, the blood-vessels of the intestines, and passes through the portal vein to the liver. There the portal vein is divided and subdivided into an infinity of minute branches as they reach the lit-

the glandular lobules which compose the liver. Here they break up into a plexus of microscopic vessels as fine as those which originally absorbed from the intestines the nutritive matter with which they are filled. These minute vessels fill the entire substance of the liver with a vascular net-work. Then these little vessels collect together again, and unite into larger ones, until at last they leave the liver as the hepatic vein, which conveys the nutritive matter called chyle. Chyle is also absorbed by the lacteal vessels, and conveyed by the thoracic duct to the sub-clavian vein, and by both sets of vessels is conveyed into and finally mingled with the venous blood returning to the heart. By the contraction of the right auricle it is forced into the right ventricle, which in turn contracts, and forces the blood into the pulmonary artery, which conveys the blood, chyle, and — alcohol? — to the lungs. There this artery divides into numberless branches which penetrate and encircle all the minute spaces between and about the air-vesicles. Here the blood is subjected to the action of the air which is inhaled by the lungs. Now, alcohol is very volatile; and if any of the alcohol has got thus far with the blood on its way to the milk, there can be no doubt that it would all be thrown off with the expiration of the breath.

But, having followed it thus far, let us go clear through to the churn, whether the alcohol keeps up with us or not.

From the lungs the blood is returned to the heart, which by the contraction of the left ventricle forces it all through the system. A large amount of blood is carried to the milk-glands. The milk-glands' office is to *secrete* milk. They secrete nothing else which is in the blood excepting those elements which constitute milk, — providing the animal is in a healthy condition.

But we will suppose, for the sake of the argument, that the alcohol is secreted by the milk-glands, and is drawn from the udder mingled with the milk. A portion of it rises with the cream, and is churned. Of course a large portion of this alcohol, which has got thus far, must remain in the buttermilk: the remainder must be so infinitesimally small that it could have no perceptible effect upon the butter.

It is evident that the professor means, when he says that the "fine flavor and texture" will be injured by the alcohol, that this injury is accomplished by the bodily presence of alcohol in such a quantity as to destroy the integrity of the butter globules; in other words, to "cut" the butter as oil is "cut" when it is shaken in a bottle with *strong* alcohol.

Now, this alcohol, which goes all the way through the various organs of the cow until it is found in the butter, — be the amount greater or smaller, — certainly cannot be very high "*proof*;" and dilute alcohol has no power to disintegrate butter, for you cannot "cut" ever so small an amount of any kind of oil with alcohol the strength of which, at once small, grows beautifully less by being subjected to unlimited dilution every time the cow drinks, and to evaporation every time she breathes.

There are millions of *excretory* ducts, organs, and glands, in the animal organism, whose office it is to remove from the system the waste tissue and such useless substances (alcohol for instance) from the system as may have been taken up by the absorbents. Does Professor Arnold expect he can run alcohol through a cow with these millions of leaks for it to escape by, and catch it in the milk-pail strong enough to disintegrate butter?

But the milk-glands are not *excretory*, but *secretory*

organs, whose office it is to secrete milk, not to remove useless matters from the organism. Even if an infinitely small amount of alcohol could get into the milk (which is absurd), and if it had the power to disintegrate or "cut" (in a measure) butter (which it would not), I fail to see how it could injure the flavor (and every thing but the pure alcohol would be there anyway). Why, alcohol is the vehicle in which the most delicate flavors are preserved, while the sweetest odors of the roses of June are saved by incorporating them into alcohol.

I think I have demonstrated, first, that if the pure alcohol gets into the milk it could do no harm to the flavor of the butter; second, that it would be infinitely diluted, so as to be powerless to affect the texture; third, that the amount would be infinitesimally small, that it could not be detected; and, fourth, that none could get there at all.

Now, my friend Rice, let us prove this thing by actual experiment. Give to each of your cows daily a tablespoonful of alcohol (which is more than there is in a cow's daily ration of Ensilage); sprinkle it upon their food; examine the butter critically which is made while the alcohol is being administered: if it is injured in flavor or texture in the least, the professor is right, and I am wrong; if, on the other hand, it is uninjured, why, for once he is mistaken.

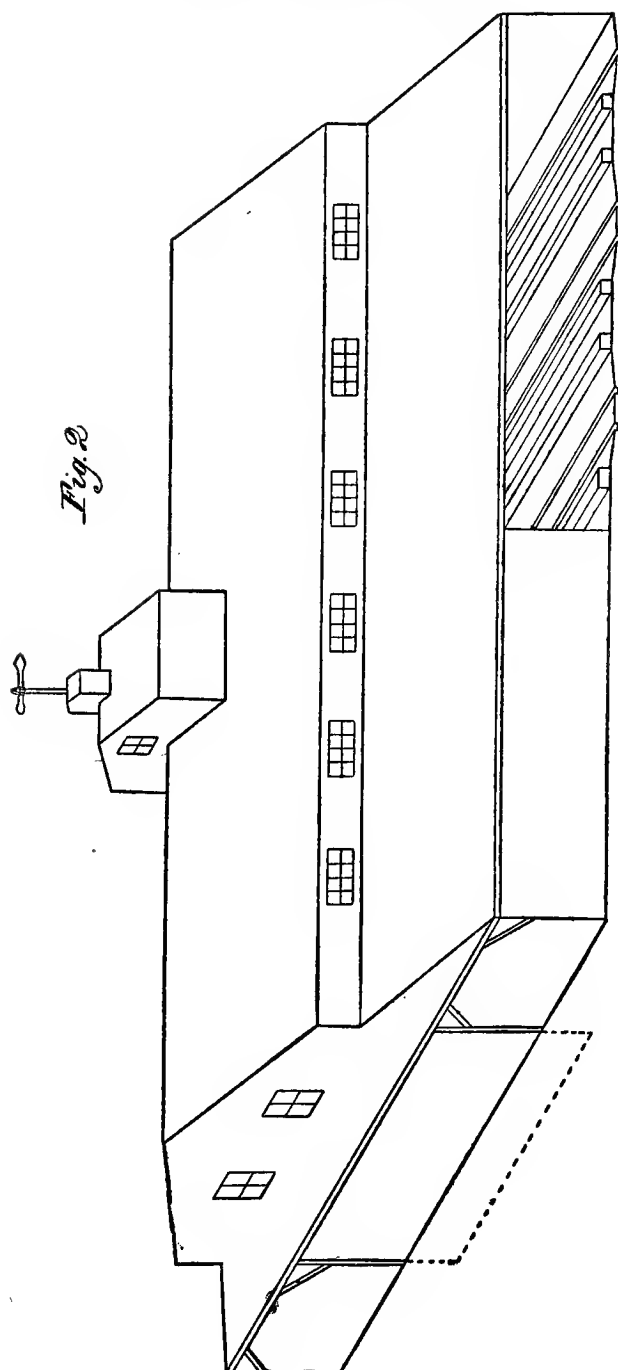
CHAPTER XXII.

MODEL DAIRY STABLE ADAPTED TO THE SYSTEM OF ENSILAGE.

FIG. No. 1 (see next page) shows the ground-plan of a dairy establishment 76 feet wide, 127 feet long, capable of accommodating 118 cows, the necessary young cattle if dairy stock is to be raised, or, if cows are bought, ample room for a flock of 100 sheep, together with their year's supply of forage. There is an engine-room at the right-hand corner, 12×18 feet; next, a 12×14 feet milk and butter room, small shaft enters to attach churn to. Next, three box-stalls, 8×12 feet, opening out of a passage-way six feet wide, which leads from the principal feeding-floor to the milk and engine room. The milk and butter room is sheathed up on the outside with well-seasoned, planed, and matched lumber, and plastered on the inside, with double doors to prevent any odors from entering. The floor of the engine and butter rooms, and of the entire establishment, is cement.

A, A, A, represent an elevated track, upon which a box holding Ensilage enough to feed 25 cows is suspended. This track is overhead in the centre of the feed-floors.

The first floor into which the Silos open is 12 feet wide; next to this is a manger $2\frac{1}{2}$ feet wide; next is the lintel floor, four feet ten inches wide; next, gutter, one



foot ; next, passage-way, four feet ; next, gutter, one foot ; then another lintel, five feet ten inches ; next, a manger, $2\frac{1}{2}$ feet (by mistake it is drawn as two feet : the lintel floors are also drawn $5\frac{1}{2}$ feet wide, they should be 4 feet 10 inches to 5 feet wide) ; now comes feed-floor from which two rows of cows are fed ; between this floor and the next are two lintels, with mangers, gutters, and passage-way as above ; then comes the last passage-way or feed-floor ; upon one side of this floor the lintel extends clear across the structure. The space 18×56 feet on the left of the Silos may be used as a sheep-shed, or be subdivided to suit for the keeping of calves, &c.

Fig. 2 is an elevation of the same, showing the general shape of the superstructure, also position and an end view of the mangers, position of the gutters, which should be about six inches deep ; also sloping floor upon which the cows stand ; this floor should incline towards the gutter, one inch at least to the foot. On this side of the stable there should be three sliding doors, one at the corner, the others in centres of the double lintels. They should be nine feet wide, so that the manure can be loaded upon a manure-spreader or cart, and be hauled directly to the fields, and spread upon the land.

The dotted line at the left hand shows that portion of the Silos which is under ground. This figure is drawn with the posts 16 feet high, which is higher than is necessary : 10 feet is ample. The Silos are 18×48 feet inside, and 23 feet deep : they will hold 1,000 tons of Ensilage, which is sufficient to feed 100 cows one year. The rye Ensilage, which can be raised upon the same land as the 1,000 tons of corn Ensilage, will furnish plenty of feed to keep the other 18 cows, the calves and young stock, or 100 to 150 sheep.

Fig. 3 shows how the travelling feed-box may be

constructed. The bottom is sloped up at the end; the head-boards can be taken out. A 12 to 16 tined fork, such as is used to handle charcoal, may be used to feed with. A little experience will enable the feeder to measure upon the fork the necessary amount of Ensilage to each cow. If the IMPROVED Ensilage is

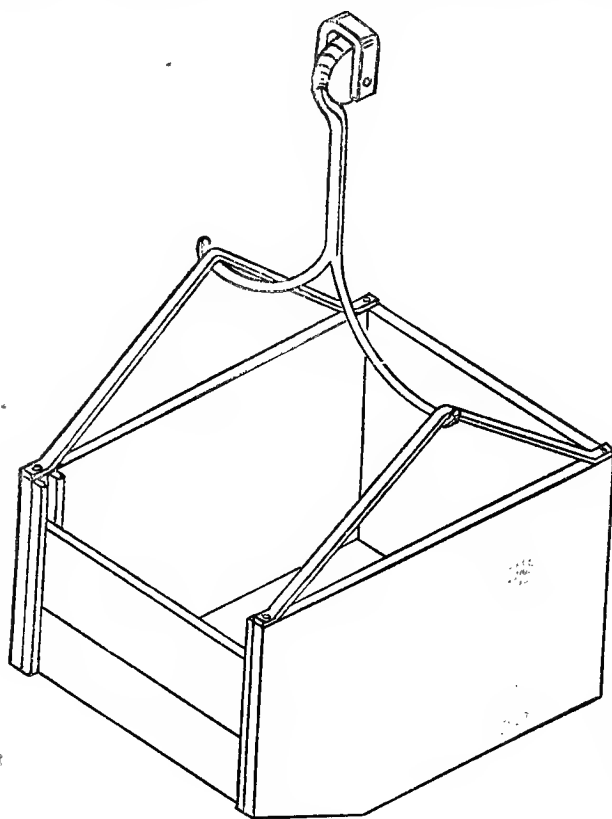


FIG. 3.

used, it will not take one man more than one hour to feed the whole 118 cows. If the grain be fed separately, it will take at least an hour to feed the grain alone. This feed-box is made four feet long, $2\frac{1}{2}$ feet wide, and $2\frac{1}{2}$ feet high.

This dairy establishment can be built, Silos and all, for less than one-half the cost of the necessary storage and stable room, when the same amount of stock are kept upon hay and grain.

The corn-fodder and green rye necessary to keep the 118 cows, calves, and yearlings or sheep, *can* be raised upon 30 acres of good land, while upon a hay and grain diet it would require at least 118 acres of the very best land to keep the cows alone.

Ensilage will re-people and restore the old deserted farms of New England. Thousands of these farms, with comfortable buildings, can be bought for less than half the improvements would cost.

The hitherto insurmountable difficulty has been to get a stock of manure to begin with, there being none for sale in the back counties, and the transportation from the cities would make it cost too much. I propose to show how that obstacle can be overcome. Let the purchaser of one of these old farms commence operations in the spring. He will require a pair of good strong horses, and need a couple of cows, a dozen or two of fowls, and ought to have four good breeding-sows and a Berkshire boar. Turn the cows and the hogs out to pasture; cut down and burn the bushes upon the best of the old grass-fields; the last of May and the first of June break up 15 acres, turning under the green growth; if there is a good thick sod, it would pay to sow broadcast 100 pounds of nitrate of soda to the acre about the 20th of April: this will stimulate the grass to grow, and give a much larger green crop to turn under. After breaking, harrow twice with the Randall disk-harrow, then with the smoothing-harrow. Plant in drills four feet apart, using half a bushel of Mammoth Ensilage seed-corn to the acre, and distribute in the drills 200 to 300 pounds of Bradley's

X L phosphate, or any other equally good and reliable fertilizer, if you can obtain it. I have used the X L phosphate for many years, and it has never disappointed me. On land where there is but little grass to turn under, better broadcast from 200 to 300 pounds of phosphate, and harrow it in before planting. The corn comes up large and strong, with a dark, healthy green color: it soon carries it out of the way of the cut-worm, and is sufficient for its rapid growth until the rootlets reach the mass of decaying vegetable matter turned under, which is one of the *best* fertilizers to make an immense growth of corn. The corn will be ten days earlier, and twice as large, for the phosphate. In short, about 200 pounds of standard fertilizer to the acre in the drill will pay, no matter how much stable-manure you may have. The labor saved of preparing, composting, and distributing the stable-manure will pay for and apply the phosphate, so that whatever fertilizing material there is in the phosphate actually costs nothing.

15 acres, planted and fertilized as above, will produce *at least* 300 tons of corn-fodder. After planting is finished, build two Silos after the plan on page 73, but larger, say 15 feet wide, 12 or 15 feet high, and 30 to 35 feet long: they will cost about \$80 to \$100 for cement, lumber, and extra labor in laying the wall, besides the labor of the farmer and his team. Now the man who has followed my plan thus far, and Ensilaged his corn-fodder, will find himself, at the approach of winter, with ample forage to keep 30 cows the year round, or to winter 60 head, or five cows and 250 to 300 sheep. If he has money enough, and his wife is a strong and able help-mate, and they fancy dairying, let him buy 25 good new-milch cows, sell butter, and follow the advice given Sylvester with swine.

If he has but little money, or does not like dairying, let him take sheep to keep upon shares, saving the best ewe lambs. The sale of wool and ram lambs will give him a good revenue. In the spring, if he has used, as he should, plenty of dry muck or loam for absorbents, he will have a pile of manure which will make the old field smile. Thereafter pursue the course laid down (see page 37), — sow winter rye (applying the stable-manure broadcast during the fall and winter), to cut and Ensilage in May or the first of June, then plough at once, and drill in the corn with phosphate. Every year will witness increased fertility, more stock, larger crops, and greater prosperity.

CHAPTER XXIII.

CONCLUSION OF THE BOOK OF ENSILAGE.

IN conclusion, fellow-farmers, let me tell you why I have written this book. In the first place, I am actuated by an earnest desire to do all I can to improve the condition of the American farmer. His life has been too long a life of toil and drudgery. He has had little if any time for social enjoyment or intellectual improvement. Hard work continuously, accompanied by the most parsimonious economy, has been the only way by which he could hope to acquire a competence for his old age. In this fierce struggle oftentimes the farmer's wife has had the hardest lot of the two; working from early morn until late at night, the slave of a horde of hired men the profit on whose labor, by the old systems, was so slender that the expense of a hired girl would have put the balance on the wrong side, till at last, weary and worn, too often she lies down to her last sleep when but half way on the journey of life; leaving a family of children to grow up as best they may, without any of those tender and hallowed influences which ought to surround every fireside, and make its bright and happy memories in after life a golden shield of protection to keep them from straying from the right way wherein there is happiness, joy, and peace.

The boys grow up. They hate farming: they go to

the city, and join the already crowded trades, professions, or occupations ; and, in ninety cases out of one hundred, their lives are failures.

The girls declare they "won't marry a farmer!" (That is one reason why "the boys leave the farm.") They go into the factories, shops, and to — God knows where! let us hope he will watch over them, and guide their footsteps to something better than that which awaits too many who go to the city fresh and pure as the air on their native hills, to meet disappointment and privation, till at last they sink out of sight, ruined, — lost!

What is necessary to change all this, is larger crops, more and better stock, and consequently greater profits. This will give the necessary leisure for improvement, for rest, and recreation.

By adopting the system of "Ensilage," the labor of a farm can be so systemized that these opportunities can be improved, and the farmer's life become in fact, what it has always been in theory, and sometimes in practice,— the most independent and honorable of any class.

Secondly, Since I opened my Silo, and the papers all gave more or less accurate and detailed accounts of my success in preserving corn-fodder in its green state, I have received an immense number of letters from all parts of the country, asking me to "please give them a little more information '*how*' I did it," &c. Well, I have answered several hundred ; I hated to refuse or neglect so civil a request from so large a number of the very men whom I most respect ; but it had come to this pass, that I had got to employ an amanuensis, and devote my whole time to diffusing information through the mails, or refuse to answer nine-tenths of the inquiries.

Several hundred years ago they used to diffuse knowl-

edge by the means of manuscript sent to parties desiring it; but it soon struck me that in this present enlightened Ensil-age it was not exactly "up to the times!" I have therefore jotted down, as I have had leisure, what I know about the system. I feel diffident in thus giving instruction how to proceed, for I know I have much yet to learn; but the farmer who carefully studies this book will know a great deal better how to go to work than I did when I began; and my cattle and sheep all told me to-day (May 25) that it "was the greatest kind of a success!" But then, my stock like me, and are doubtless partial.

Next in importance to having the best and cheapest food for our animals, is having the best breeds of animals to feed it to, so as to obtain the greatest returns. Therefore I have added a short description of the herds and flocks of "Winning Farm" and "Virginia Stock Farm," together with more or less concerning the different breeds. I confess that my object is not *altogether* a benevolent desire to benefit others solely, but is partly for the purpose of advertising my horses, cattle, sheep, and swine. I have fine stock to sell for breeding-purposes, — I make a business of raising them. Now, if any have followed me thus far through the Book of ENSILAGE, and do not care to read any thing more about the animals which are so grateful for the Ensilage they have eaten and grown fat upon the past winter, to them I will say, that, as far as I know, there is no law which will compel them to read a single line further than they care to.

PERCHERON HORSES.

CHAPTER I.

THE HORSE OF THE FUTURE.

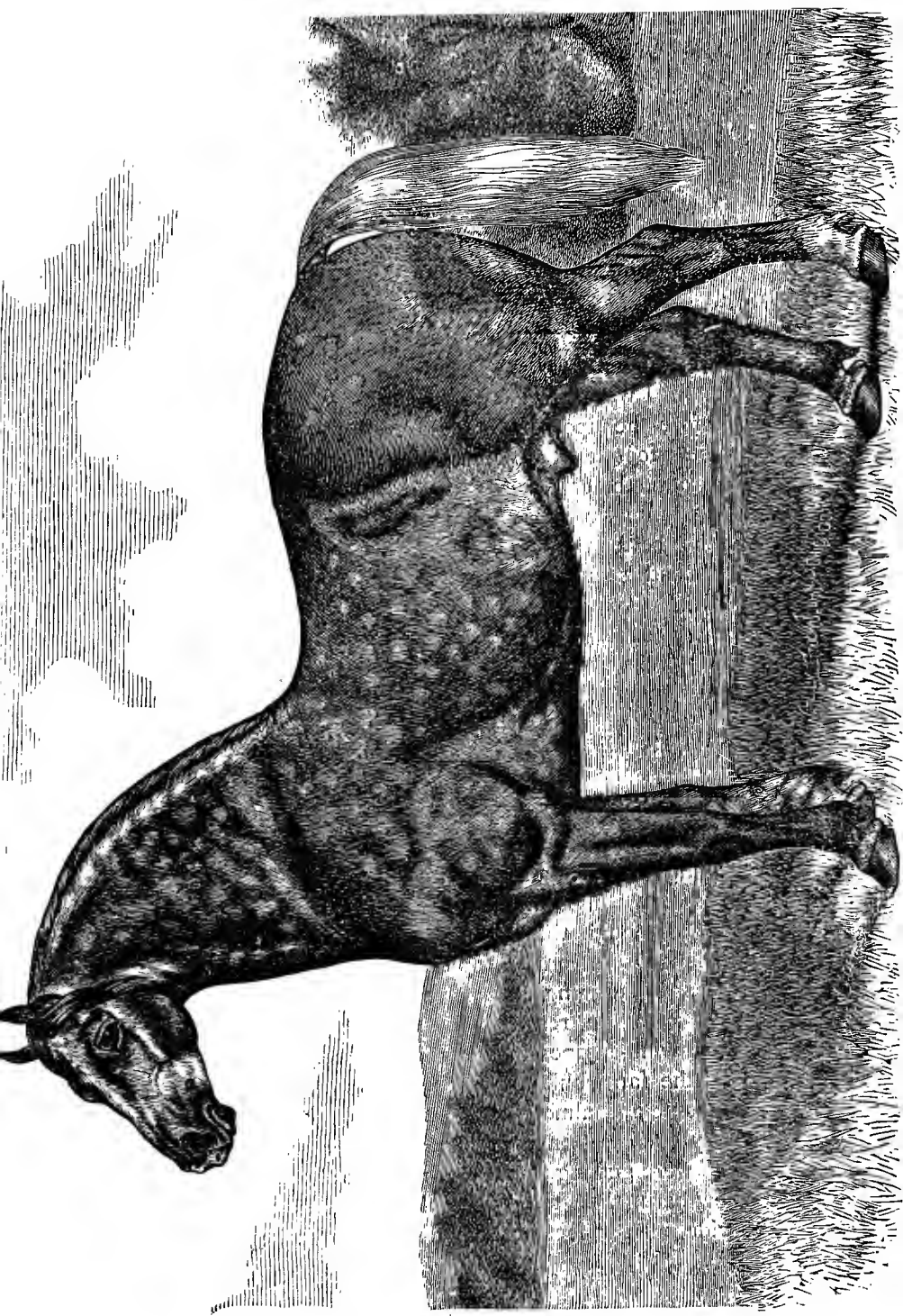
FOR some time I have been very much interested in considering how the common horses of our country might be improved. For several years past a mania has seemed to possess the American farmer on the subject of horse-racing. Speed, not endurance, a lively spurt on the road, not strength at the plough and ability to pull a heavy load at a good fast walk, have ruled. What the farmers need has been, and is, powerful horses, with sufficient action to take them fifty miles a day and return the next, without being knocked up for a week, and haul a comfortable carriage, with two or four persons in it, — horses that can take a load of produce to market, and come home bright and cheerful, and ready for their feed, and a day's work on the morrow. There is a surplus of stallions with' a trotting or running pedigree, and also of those who can trot to harness a mile or two quite lively. Horses that can trot in forty, or even in thirty, are very nice toys for gentlemen of wealth whose fancy is for a fast team, or of leisure, who want something with which to kill time; but for real service and practical utility they are of about as much use as the New-York Coaching Club's turnouts.

Therefore, on my way to Elkhart Park, the home of J. D.

Gillett, the noted short-horn-cattle-raiser, of which I shall say more hereafter, I stopped one day at Oakland, the home of M. W. Dunham, the great Percheron-Norman-horse-importer.

Mr. Dunham's farm comprises six hundred acres of very fertile and beautifully-lying land, in Wayne, Ill. I left Chicago on an early train, and, after a pleasant ride of thirty-four miles, arrived at Wayne. Upon inquiring, I was directed to Oakland Stud Farm, distant just one mile, over a beautiful broad avenue ornamented by a fine hedge and rows of shade-trees on either side. As I was walking along, admiring the broad fields spread out before me upon every hand, suddenly I heard the sound of a horse's footsteps rapidly approaching. I had hardly time to look around before a man passed me, his horse a magnificent-looking animal, weighing over 1,500 pounds, and trotting considerably better than a four-minute gait. I instinctively knew that I had seen one of Mr. Dunham's Percherons. I had examined his catalogue, filled as it is with beautiful pictures of Percheron horses, and, in common with many others, had thought the great animal artist, Dewey, had flattered the animals he portrayed; but when that horse so grandly swept by me at such tremendous speed, — for a horse of his size, — I mentally asked to be forgiven for wronging, in such an ungenerous manner, Mr. Dunham, the artist, and the horses themselves. This little incident had prepared me, in a measure, for what I was to see.

I found Mr. Dunham superintending the building of a large cistern upon a high hill about a quarter of a mile beyond his house. Although the hill is at least one hundred feet higher than his house, upon the top of it he finds an unfailing supply of water, by digging thirty-five or forty feet. The water is pumped into the reservoir by a large pump, operated by a powerful wind-engine. From the reservoir a two-inch pipe is laid to the farm buildings, and distributed in smaller pipes to every stable and almost every stall. Mr. Dunham greeted me cordially, and at once returned to the stables. While the "boys" were getting the horses ready to show, he led the way to his new barn, then nearly completed. It is 160 feet long, 52 feet wide, with 20-feet posts, and contains 10 box-stalls 16 feet



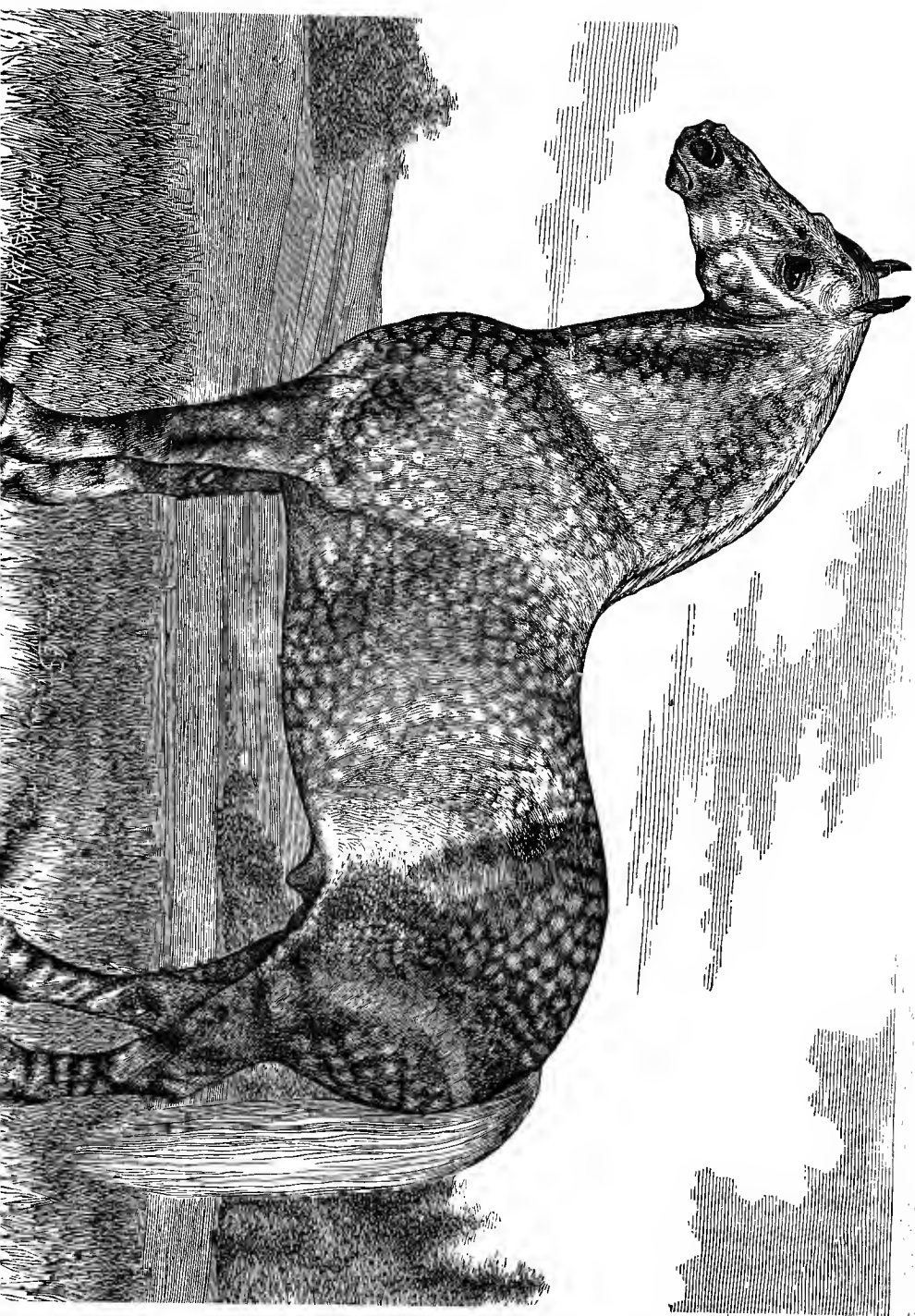
square, and 10 stalls 16 feet wide by 32 feet long. Each stall is sheathed up all around, about six feet high. Above that, to the ceiling overhead, the partitions are made of two-by-two-inch pickets, set two inches apart. The object of this is, as Mr. Dunham expressed it, "for sociability: a horse loves company as well as you do, and without it he will not be happy. If he is not happy he will not do well; neither will he behave as well when taken out if kept in solitude, for then he is easily excited by other horses." Mr. Dunham has nearly two hundred horses; and all of them, excepting the yearling colts, are kept in box-stalls, and only one horse in a stall. The stalls are all from 14 to 16 feet square, with straw for bedding up to the horses' knees. This will give the reader some idea of the immensity of the establishment.

By this time the boys were ready to show some colts. I cannot particularize; but I saw pure-bred two-year-old colts by the score, that were as handsome as any picture could be; clean heads, bright, large, intelligent eyes, ears like a thoroughbred, and with limbs as clean, yet weighing all the way from 1,300 to 1,650 pounds each, and, notwithstanding their weight, as quick and trappy in their movements as any 900-pound horse. I was next shown a number of half and three-quarter bloods; that is, their sires were imported, while their dams or grand-dams were common native mares, weighing from 900 to 1,100 pounds each. These grades—if I may call them so—were, if possible, more beautiful than the pure-bred colts we had just seen. They (two-year-olds) would weigh from 1,200 to 1,500 pounds each, being rather lighter in the bone than the pure-bred, but with legs as broad and flat as your hand, with the back tendon almost as large as the bone in front, and each cord and sinew showing as distinctly as though no hair or skin covered them. I was convinced that in these half and three-quarter blood Percherons I saw the "horse of the future." They have all the attributes which a man could ask for in a horse, unless he is a fast-horse man, and wants a trotter: they have size and strength, plenty of action, beautiful figures, and speed enough for all road purposes. Next I was shown a large number of stallions, from three-year-olds up to "Success," aged 15 years. I cannot

describe them. The illustrations in Mr. Dunham's catalogue, and in "The National Stock Journal," do not do them justice. They are massive! They are magnificent! Their weights (and no guess-work; I saw them weighed by the score) ranged from 1,600 to 2,160 pounds, and for action they are as quick as cats. I must name one, however, "Vidocq" (see cut on opposite page). He weighs 1,850 pounds; can trot a mile in four minutes; has as clean a head and ear as any thoroughbred; his feet hardly seem to touch the ground, he picks them up so lightly. He fairly divides the honors with "Success," the king of the stud. He is a beautiful dapple-gray. Such a back! Such a breast! Such a neck! Although only 16½ hands high, his head seems almost in the clouds, he carries it so grandly.

Time for the return train would only allow me a hurried look at the yearling colts, brood-mares and their sucking colts. Gray is the prevailing color, black comes next, though there are occasionally bays and chestnuts. Of course I saw the mare "Mignonette," the prize-winner at the Centennial. Her picture does not do her justice. Her head is a study; she weighs over 2,100 pounds, and moves as lightly and easily as if she weighed but half that much. Suffice it to say, that I saw sucking colts that would weigh from 800 to 1,000 pounds, and yearling colts that would weigh up to 1,460 pounds, and not a clumsy, awkward, or mean one in the whole establishment. A man to appreciate Mr. Dunham's stud ought to spend at least a week with him. I was prepossessed, I confess, in favor of Percherons; but I had no idea I should see such horses, they were so much better than I had ever imagined horses of their size could be.

In accordance with the impression received at this visit, I resolved to possess at least one thorough-bred Percheron. Therefore early this spring I directed my agent in France to purchase for me the best Percheron stallion he could procure, *regardless of price*. I have the satisfaction of being able to state that my agent writes me that he has secured a prodigy for me. I only regret that this book goes to press before he will arrive, so that in this edition I am unable to present his portrait.



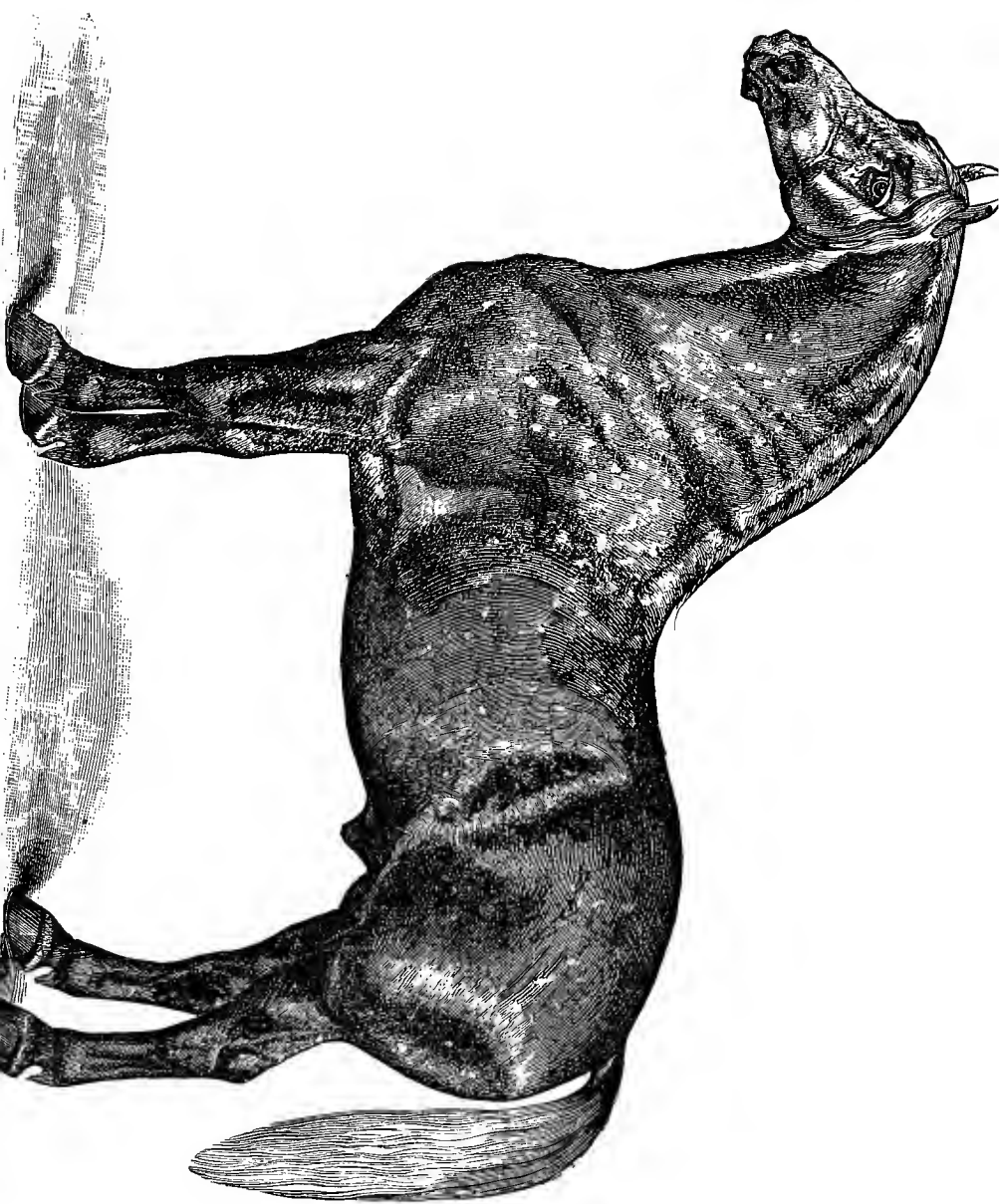
He will make the season this spring at "Winning Farm." In the fall he will go to "Virginia Stock Farm," where I have thirty-five Canada-bred mares to be served by him, which I imported expressly for breeders. (See cut on opposite page.)

He arrived on the 25th of May, 1880; and to say that I am perfectly satisfied with my purchase, is doing him but simple justice. He is four years old, 16½ hands high, and although thin in flesh weighs 1,600 pounds; will easily make an 1,850-pound horse when fully matured. He reminds me very much of Mr. Dunham's "Vidocq;" his color is a very dark iron-gray (slightly showing the dapple), with white mane and tail; his ears are as fine as a thoroughbred, and not larger than the average 900-pound horse. He carries his head high with beautiful crest; his lofty carriage would attract attention anywhere. His arm and quarters are unequalled, hood-back, long level haunch, extraordinary flank: these are points of excellence, of vital importance, which he possesses to a remarkable degree. His legs are very clean and free from hair, upon which he stands squarely and perfectly. His feet are of the best: when in motion the lightness and elasticity of his step, the ease and style of his movements, are such as are rarely surpassed in light horses.

In all his attributes, especially his muscular development, spirit, and energy, he bears unmistakable evidence of purity of blood, through which for untold generations his Arab characteristics, improved and adapted to modern wants, have descended.

He will be allowed to serve a limited number of mares at \$40, half forfeit.

Mares from a distance will be kept and carefully cared for at \$3 per week. All accidents and escapes at owner's risk.



CHAPTER II.

ORIGIN, HISTORY, CHARACTERISTICS, AND PERFORMANCES OF PERCHERON-NORMAN HORSES.

THE following information in regard to the origin, characteristics, and performances of Percheron-Norman horses has been kindly furnished by Mr. Dunham :—

Being extensively engaged in the importation and breeding of the Percheron-Norman horse, and a zealous advocate of the breed as a means of improving the horses of our country, I feel it incumbent upon me to place at the disposal of the public what information upon the subject I have obtained through my experience, or have been able to glean from historical research. In pursuance of that object, I will give some facts in a condensed form, bearing upon their characteristics, origin, breeding, tests of speed, bottom ; also their introduction into this country, with the success they have attained as a cross upon our common mares.

For the facts relating to the early history of the race, I have drawn largely upon the justly-famed works of M. Huys, a celebrated French author (unquestioned authority), which I trust may be read with interest and prove of value to those interested in the improvement and production of a better class of large horses.

The question of the *necessity* of improvement in that direction is now rapidly becoming apparent to *everybody*. But years ago, when the country was flooded with small stallions of every

breed and under every name ; when the trotting fever was at its height, and thousands of farmers were pursuing, with an eagerness amounting to a passion, the vain fantasy of becoming successful breeders of fast trotters ; when, under the baleful influences of the popular mania, the draught breed's were wholly ignored, — I entered into business, and became a firm advocate and a breeder in a small way, of the draught stock, believing that a re-action in public sentiment *must* take place ; that the country must recover from this general intoxication ; that the farmers would become disgusted by constant failure, and, abandoning the delusive idea of breeding fast trotters, would regain their senses ; and, with the recovery of their wonted judgment, the agricultural and draught horse would succeed to their rightful supremacy.

DESCRIPTION OF THE PERCHERON-NORMAN HORSE.

They are usually fifteen and a half to sixteen and a half hands high ; but some of the largest varieties are occasionally seventeen hands. In temperament they are sanguine, mixed in variable proportions with the musco-lymphatic. In color they are nearly always varying from white through all the different shades to black, of which color there are a few. In proportion to their predominance, these temperaments constitute types which may be classed as follows :—

First, The light or smaller type, in which the sanguine temperament predominates. This type is used exclusively for the road and saddle.

Second, The draught type, in which the lymphatic temperament prevails, and which are used for draught alone.

Third, The intermediate, between these two classes, are greatly in excess in numbers of either one of the two preceding, and in a great degree combine the qualities of the other two ; the nervous, sanguine temperament of one, with increased weight and physical development of the other. The more perfect animals of the breed may be described as follows :—

With fine style ; nostrils large and well dilated ; eye good size, mild and expressive ; forehead broad and full ; ear short and fine ; neck rather short, but nicely filled out ; withers usu-

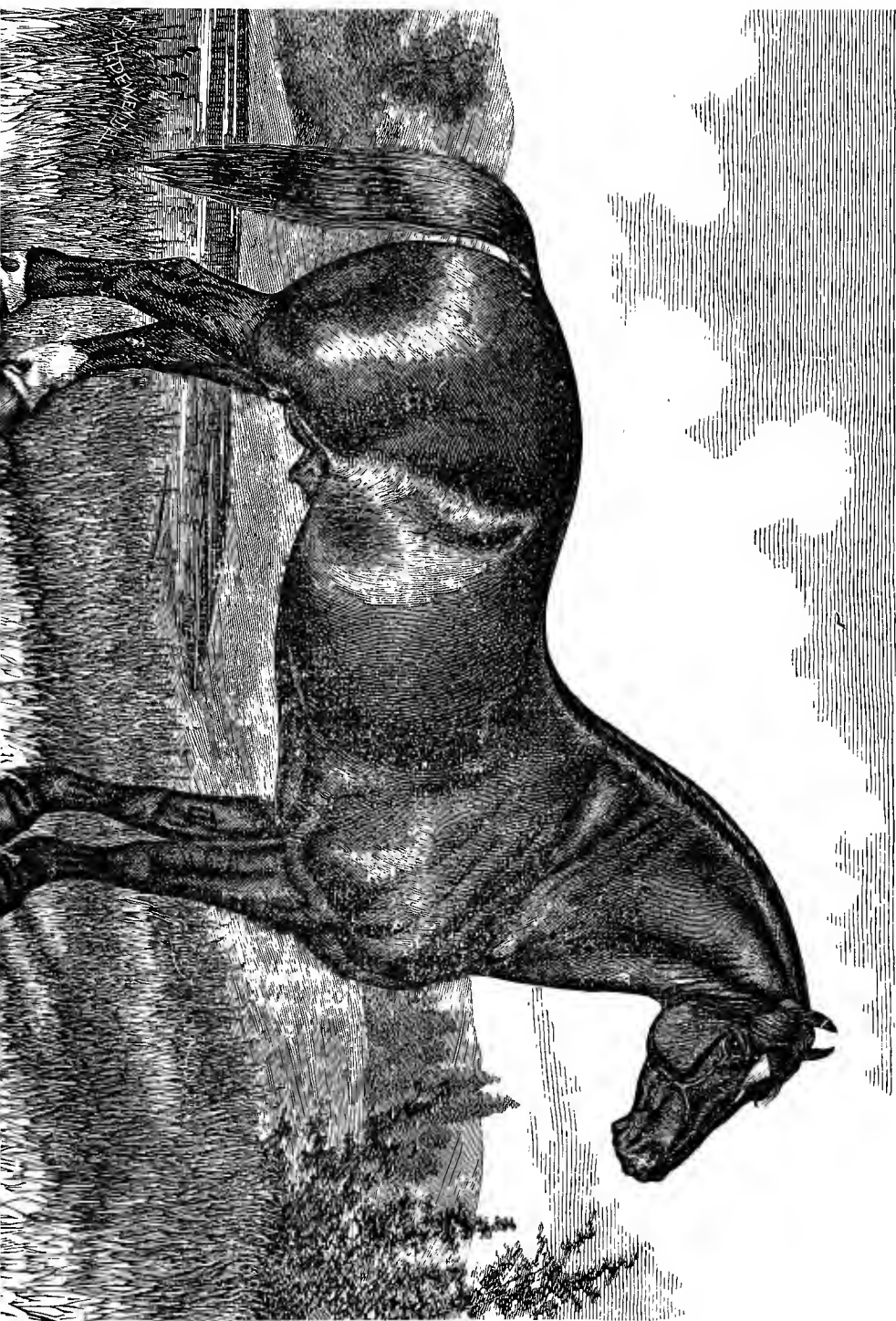
ally high ; shoulders long and nicely sloped ; breast broad and deep ; body well rounded ; croup horizontal, broad, and flat on the best varieties ; tail attached high ; joints short and firm ; feet always good ; skin very thin, and hair of the finest quality ; mane abundant and usually fine and silky. To remarkable strength, to vigor which does not degenerate, to a conformation that does not exclude elegance, it joins docility, mildness, patience, honesty, great kindness, excellent health, and hardy and elastic temperament. Its movements are rapid and easy ; it possesses uncommon endurance, both when worked hard or when forced, for unusual time, to maintain any of its natural gaits. *It possesses the inestimable quality of moving fast with heavy loads ;* and in its native country it is particularly valued for its remarkable precocity, producing more by its work at two years old than the cost of its keeping. By its nature, it inherits a real aptness for labor ; and its mild disposition and well-balanced brain makes it always reliable, and seldom subject to nervous excitement. Their excellent temper is the result of ages of kindness and gentle familiarity of those in whose hands they have been bred. (See cut of Eldorado opposite.)

Their remarkable soundness (a cause of lasting jealousy among the breeders of other races) has been established by the greatest care in breeding for many generations, until defects, such as ring-bone, curb, and spavin, are not even known by name in the country where they are raised.

ORIGIN OF THE PERCHERON HORSE.

Some attribute to him an Arabian ancestry ; while others, without positively assigning to him so noble an origin, hold him to be deeply impregnated with Arabian blood.

Eugene Perrault, one of the most extensive and skilful dealers in all Europe, has frequently remarked, that, of all the races of horses, none were so interesting to him as the Percheron ; and that, judging from his appearance and quality, he was convinced he is a genuine Arab, modified in form by climate and the peculiar labor that he has been for ages obliged to perform. There is not, however, in any written history positive evidence that the Percheron is a pure Arab, but it is easy



by fair historical deduction to prove they are in fact. It is well known, that after the defeat of the famous Saracen chief Abderame by Charles Martel on the plains of Vouille, the magnificent cavalry of the enemy fell into the hands of the victors, and the horses upon which they were mounted were, like themselves, from the East. In a division of the spoils a large number fell to the men of La Perche, Orleans, and Normandy, who composed a greater portion of the French forces. These horses must of necessity have left in their progeny indelible traces of their blood. La Perche also furnished her contingent of fighting men for the crusades; and the chronicles cite several counts of Bellesme, Mortagne, and Nogent, barons and gentlemen of that province, with many of their vassals, who made pilgrimages to the Holy Land. The Abbé Fait, in a letter directed to the Congress Mortagne, July 16, 1843, and in his great work upon La Perche, cites in this connection a Lord of Montdoubleau, Geoffroy IV., and Rotrou, Count of La Perche, as having brought back from Palestine several stallions, which were used, and their progeny most carefully preserved. The limited number of sires, their incomparable beauty and great superiority, must have led to the in-and-in breeding so much deprecated by most breeders of our time, and by which the qualities of the sires became indelibly fixed upon their progeny. It is doubtless a fact that the crusaders from France brought back with them on their return more or less of the Eastern blood, which they had learned to appreciate on the plains of Palestine. It has not, however, been preserved elsewhere; and that Perche is so fortunate as to be able to show visible traces of it after so long a time has elapsed, should stimulate them to its careful preservation. We therefore see that for antiquity the Percheron yields to no other French race; and it is conceded beyond question that the soil that has nourished them for so many generations is one of the best in France for developing to their highest state of perfection their physical forces.

Under the feudal rule Perche must have been an equestrian country, in those times of continued war and surprises, and horses suited to that purpose were an absolute necessity. The

horses at that time must of course have been light, but still possessing within themselves the same characteristics which they now present. The universal tradition of the whole country goes to prove this fact.

HOW THE PERCHERON OF FORMER TIMES WAS MODIFIED.

As we have said, the race doubtless comes from the Arab; but how has it been separated from its original type, and how has it lost its Arabian character? *All* equine races have been greatly changed by climatic effects,—by the condition of the country, at different periods, in which they were bred. The inauguration of peaceful habits made an agricultural and draught horse of the horse formerly used for the saddle and war. But the Percherons have been greatly modified by other causes than this. The contact with the breeds of Western and Northern France has modified them in a great degree. This intrusion of the heavy draught type has been vigorously opposed by many of the nobles of the country, who have continued to introduce and use numerous of the Arabian stallions at different times. We see towards 1760, under the administration of the Marquis of Briddges, manager of the stables of Pin, all the large number of Arab stallions that this establishment owned were put at the disposition of the Count of Mallart, for use at his mare-stables of Coesme, near Bellesme; and years after we find, at the same château of Coesme, the grandsons of those old admirers of the Arabian, with two Arab stallions, “Godolphin” and “Gallipoli,” both of which proved valuable stock-getters,—both gray,—which once more gave tone and ardor to the Percheron race in that vicinity. Yet these efforts on the part of the nobles of this district, to perpetuate and improve the Percheron by the introduction of stallions whose tendency was to decrease the size, met with decided opposition by the peasantry farmers of the country, who were using all means within their power to increase the size of their stock, to meet the demands that were springing up under the impulses of the new civilization. They not only resorted to the use of the largest stallions to be found in Perche to secure that object, but brought many from neighboring departments, which hastened the desired

development of the draught varieties of Perche, thus establishing a complete modification of the primitive horses of ancient Perche, and giving to the world a breed of horses that, for rapid draught, have no equal.

HOW THE PERCHERON HORSES ARE BRED AND REARED.

There is probably no country in the world where the same method of breeding is adopted that is practised in the Percheron district. The division of the sexes is the greatest peculiarity. One portion of the country contains the mares, and produces the colts, while another section buys and rears them.

To whatever class the mares belong, whether small or large or medium, they are expected to breed every year: failing to do so, they are sold. During gestation they work constantly. A few days' rest before and after foaling is the only time lost. Her work pays a large percentage above her keep and the interest on her cost. At five or six months old the colts are weaned and sold, and taken into the interior upon the rich pasture-lands of Mauves, Pin, Regmalard, Carbon, Loughny, Reveillore, Courgeron, St. Langis, Villiers, Courgeoust, &c., and for one year remain unproductive. In the winter time they are provided with hay, and well stabled, and during the fine weather are turned out to graze. In fact, they are rather poorly fed, for the cause that they are yet unproductive, and they feel the effect. Their hardest time is soon gone by, and work softens their lot. They are kept in this manner until they are about a year and a half old, and then put to work; four or five colts usually put together to do the work of two good horses. They are now better fed and better taken care of, and the improvement is very perceptible. Their owners seem to enjoy viewing the progress of their development. There is probably no place where the people as a whole take such deep interest, and appear to have so much love for horses, as in this small district of Perche. In travelling through the country, one cannot but admire the skill and patience used in working the young animals, and is astonished at the vigor and power they display for colts of their age. When they are three years old, there is a ready market for them on the plains of Beauce, to work the soft, light soil. They have

thus been worked one year, fed but little grain, and doing enough light work to pay for their keeping. This early work, which would be injurious under bad management, proves decidedly beneficial in the hands of good horsemen.

As we have remarked, the Beauce farmer is a ready buyer, when they arrive at three years of age. On the plains there is a large amount of work to be performed, but the nature of the soil renders it very easy. The people live mostly in villages; and the fields are distant from one another, making a rapid gait absolutely necessary. They must be quick, active horses, for the acreage of land to be tilled is very great, and the work must be done promptly. The labor is very severe; but they are well fed, and the best of care is taken of them. They are used in this way one or two years, when they are sold to the express and omnibus companies, or to the contractors, wagoners, or builders of Paris, according as they seem fit for the different kinds of work. Thus we see a breed of horses of the highest economical and practical utility, the colts of which are raised at a moderate cost, their work paying for their keeping. The system practised in rearing them gives to them the most perfect physical development, and makes the Percheron what he always has been, the best rapid draught-horse in the world, and will always continue to be, unless the admirable qualities they possess lead to their future degeneration.

The success of the Percheron race has been remarkable. All departments and all nations wish to procure it. The prices of the choicest stallions have increased so rapidly in the past few years, that they have doubled and trebled in value. The authorities have attempted to hinder emigration of their best stallions, by offering large annual prizes for the choicest animals that were retained for service in that country. The project, however, had a contrary effect from what was expected. The prizes served as signs to the foreign buyers, who came to France to purchase the choicest animals, and no surer guaranty than the prize could be had. The owners of such horses cannot resist the almost fabulous prices offered for their stallions; and thus disappears, year by year, the flower of their stallions and brood-mares. The Percheron breeders are reaping the

benefits of the present, without thinking what will be the effect in the future.

SPEED AND ENDURANCE OF THE PERCHERON.

One of the qualities of this breed of horses, and which has acquired for it a universal reputation, is fast trotting while drawing a heavy load ; but it would be an error to suppose that this ability to trot fast makes it an equal in every respect to the trotting breeds of the present day. The trotters draw very little, but have a long stride ; and, as regards mere speed, there is no comparison. The specialty of the Percheron — rapid draught — has its limits ; and it is these limits that I wish to make known by numerous examples officially reported. What the Percherons do in the diligences, mail and post coaches, is known to every foreign traveller, and it is useless to enlarge upon it. From one relay to another, drawing not less than two and often three thousand pounds, in all kinds of weather, over hilly roads, they make their three leagues an hour and sometimes four ; but this is *ne plus ultra*. What they do in the omnibuses, the world that visits Paris sees only to admire, and forms one of the greatest attractions of the Percheron horse to the observing stranger.

We will now turn our attention to the trials made upon their trotting tracks. The places most frequented are those of Illiers, Courtalain, Montdoubleau, and Mortagne ; and in order to be impartial it is necessary to state that the tracks, all but the one at Mortagne, are ploughed fields, hard in dry weather but cut up in wet times, and that the track at Mortagne is badly located, having three steep inclines up and down inside of the mile, and the horses that have done best elsewhere have failed on this track, and it has taken a longer time to go the distance. To this circumstance is attributed the low averages made upon that track, but it also shows the courage of the animals. When a colt of two and a half years of age — there were several of this age — can accomplish his task by going two or three times around this track, there is a reasonable certainty of there being the elements in him for the making of a valuable horse. The most of the horses are trotted under the saddle, as their vehicles are of the most cumbersome character, and utterly unfitted to trot a horse in.

The following shows the results of one hundred and eighty-nine matches officially reported, and two trials to prove bottom, likewise certified to, and will give an average of what the best Percherons are capable of doing.

In order to be strictly impartial, the slowest and fastest time made is given.

UNDER THE SADDLE — ONE MILE AND A QUARTER — TWENTY-NINE RESULTS.

The best two are those of "Julie" at Montdobleau; time, 3 min. 50 sec.

The poorest two results are those of "Vidocq" at Mortagne; time, 7 min. and 37 sec.: and of "Lansquenet," same place; time, 7 min. 48 sec.

The average time of twenty-nine recorded trials is 4 min. 12 sec.

ONE AND FIVE-SIXTHS MILES — THIRTY-ONE RESULTS.

The best two are those of "Valliante" at Mortagne; 4 min. 38 sec.: and "Julie" at Montdobleau; 6 min. and 14 sec.

The poorest two are those of "Mouche" at Mortagne; time, 9 min. 18 sec.: and of "Biche," same place; 8 min. 30 sec.

The average time of thirty-one trials, 6 min. 40 sec.

TWO MILES — FORTY RESULTS.

The best two are those of "Cocotte," at Illiers; time, 6 min. 5½ sec.: and "Sarah," same place; time, 6 min. 2 sec.

The two poorest are those of "Balzane" at Illiers; time, 9 min. 40 sec.: and of "Renaud," same place; time, 10 min. 30 sec.

The average time of forty trials is about 7 min. 20 sec.

TWO AND A HALF MILES — SIXTY-FIVE RESULTS.

The best two are those of "Sarah" at Langou; time, 7 min. 35 sec.: and same at Mortagne; time, 7 min. and 40 sec.

The poorest are those of "Marmotte" at Mortagne; time, 13 min. 26 sec.: and of "Julie," at Courtalain; time, 11 min. 30 sec.

Average time of sixty-five trials, 9 min. 15 sec.

Two and three-fifths miles were made at Illiers by "Bichette," in 12 min. 15 sec.

Two and five-sixths miles were made by same, at same place, and gave an average of 11 min. 30 sec., in three successive heats.

Three and two-fifths miles were made by "Champion," at Illiers, in 12 min.

HORSES TO HARNESS—TWO MILES—EIGHT RESULTS.

The best two are those of "Achille," at Illiers; time, 7 min. 17 sec.: and "Julie," same place; time, 7 min. 40½ sec.

The poorest two are those of "Campionette," at Illiers; time, 7 min. 53 sec.: and "Bichette," same place; time, 8 min. 13 sec.

The average of eight trials is about 7 min. and 36 sec.

TWO AND A HALF MILES—FOURTEEN RESULTS.

The best two are those of "Vigoureux," at Illiers; time, 8 min. 30 sec.: and "Bibe," at Mortagne; time, 9 min. 54 sec.

The poorest two are those of "Bichette," at Courtalain, in 11 min. 30 sec., and of "Artagan," at Mortagne, in 11 min. 55 sec.

TWO AND THREE-FIFTHS MILES—LOADED.

Two trials were made at Rouen, by "Decidée," the first drawing 386 pounds in 9 min. 21 sec., the second time drawing 408 pounds in 10 min. 49 sec.

TRIALS OF ENDURANCE AND SPEED.

A gray mare, bred by M. Boulavois, at Almenasches (Orme), and belonging to M. Montreaul, horse-dealer at Alençon, performed the following match: Harnessed to a travelling-tilbury, she started from Bernay to go to Alençon, a distance of fifty-five and three-fifths miles, over a hilly and difficult road, reaching there in 4 h. 24 min. This mare is still living, and now belongs to M. Biuson, hotel-keeper at Lees (Orne), where she still draws the omnibus plying between the hotel and station.

A gray mare seven years old, belonging to M. Cousturur, at Fleury sur Andelle (Eure), harnessed to a tilbury, travelled

fifty-eight miles and back, on two consecutive days, going at a trot and without being touched with a whip. This was over the road from Lyons la Fosette to Point Andmere and back through a hilly country. The following time was made: The first day the distance was trotted in 4 h. 1 min. 35 sec.; the second day, 4 h. 1 min. 30 sec. The last thirteen and three-fourths miles were made in one hour, although the mare was obliged to pass her stable, at the forty-first mile, to finish the distance.

THE PERCHERON IN AMERICA.

The preceding pages give a fair idea of the Percheron horse in his native country,—his value as a draught-horse, and his capabilities upon the road.

But what is *more* necessary for *us* to know is, whether it is adapted to *our* wants; whether it can reproduce with a certainty its own valuable qualities in its progeny, when bred to the common mares of the country.

For evidence upon this point we can only look to the past, and base our judgment upon the results obtained by actual trial. For that purpose I invited attention to the following brief retrospect of their history in America:—

The settlement of Canada by the French is the date at which the introduction of the French race into North America can be placed. In seeking homes in the New World, they brought with them their own domestic animals, foremost among which were their horses, they being a prime necessity for the cultivation of the soil upon which they were in the future to depend for their support and prosperity. The change from the salubrious climate of sunny France to the cold, bleak hills of the lower St. Lawrence, must have been a severe one. But their natural constitutional vigor and hardihood sustained them; although the rigor of the winters, their scanty fare, and the innumerable hardships they were forced to endure, tended to greatly reduce their size, and increase their hardiness, establishing for them the reputation as the toughest of all breeds, until "*tough as a Canadian pony*" became a common term all over the country in expressing the superlative of hardiness. They were no doubt for many years kept pure; but the conquest by

the English, and the consequent introduction of the English horse, soon led to a fusion of the two breeds to some extent, — with the most happy results, — and many of the most famous horses of our day are traceable to that cross. In fact, the great-grand sire of “Lulu,” acknowledged the fastest trotting mare now living, was an imported French horse, and many other famous ones of the same origin.

I find the following in regard to the Canadian horse, written in 1850 by Henry S. Randall, a well-known American agriculturist : —

“Found in the Canadian Provinces, and somewhat in the Northern United States, he is mainly of French descent. They are long-lived, easily kept, and an *exceedingly hardy* race, making good farm and draught horses when sufficiently large.

“In form they display in a marked manner the characteristics of the Norman race. So, too, in their general qualities, though considerably smaller. Stallions of this breed have, in various instances of late, been introduced into New York and other Northern States, to cross upon our common mares. The results have been *decidedly* satisfactory, particularly in giving compactness and vigor of constitution where the dam does not excel in those particulars. A stallion imported a few years since from Canada, by Mr. John Legg, has got several hundred colts, which, when broken and sold, averaged considerably above the prices of the horses of the country. They are almost invariably fair roadsters and excellent farm-horses. This cross is more and more finding favor among our farmers.”

Though *many* stallions were brought from Canada to the United States at early dates, yet their importation direct from France did not begin until 1839, when Mr. Harris, of Morristown, N.J., introduced the breed. From a letter bearing date April 6, 1850, written by Mr. Harris to a friend who made some inquiries regarding the success of his enterprise, I extract the following : —

“These horses first came under my observation on a journey through France in 1831. I was struck by the immense power

displayed by them in drawing the heavy diligences of the country at a pace which, although not as rapid as the stage-coach travelling of England, yet such a pace — say from five to nine miles per hour — the lowest rate of which, I do not hesitate to say, would in a short time kill the English horse if placed before the same load. In confirmation of this opinion, I refer you to an article upon the Norman horse, written by an Englishman, and published in ‘The British Quarterly Journal of Agriculture,’ in which the writer, in giving an account of the origin of the horse, which agrees in tracing it to Arabian ancestry, says:—

“‘The horses of Normandy are a capital race for *hard work* and *scanty fare*. I have *never seen* such horses at the collar, under the diligence, the post-carriage, the cumbrous and heavy voiture or cabriolet for one or two horses, or on the farm. They are *enduring and energetic beyond description*; with their neck cut to the bone, they flinch not. They put forth all their efforts at the voice of their driver or at the dread sound of the whip. *They keep their condition when other horses would die of neglect and hard treatment*. A better cross for some of our horses cannot be imagined than those of Normandy.’

“My own impression being fortified by such authority, from such a source, where we look for little praise of any thing French, and also from various other authorities, both written and verbal, I made up my mind to return to France at an early day and select a stallion at least, as an experiment in crossing upon the light mares of New Jersey. My intentions were unavoidably delayed until 1839, when I went seriously to work to purchase one stallion and two mares. The stallion and one mare died before reaching home. I at once returned, and bought two stallions and one more mare, and reached home with them in safety. One of the stallions I got only one season’s service from. The other one has now made ten seasons, with an average of about eighty mares the season. And, if *their* success is any evidence of the value of the breed, I can state that, of over four hundred colts produced, I have never yet heard of one that would not readily bring one hundred dollars, and *many* of them much higher prices. You can therefore

judge of the benefits that have accrued from their service. I have yet to learn of one worthless colt; nor have I heard of one that is spavined, ringboned, curbed, or that has any of those defects which render utterly useless so many of the fine-bred colts of the present day.

"In reply to your query as to how they cross with thoroughbred mares, I will say I have never bred to strictly pure thoroughbreds, there being none here; but those mares nearest approaching it have produced the cleanest, neatest, and handsomest colts, though hardly large enough to bring the highest prices. Those I know of that cross are excellent performers.

"To the question, 'What is the result of the cross with different styles of mares, as regards shape?' As regards shape, you may depend upon the predominance of the form of the horse in nine cases out of ten. Indeed, I have seen only one colt I could not instantly recognize from the form.

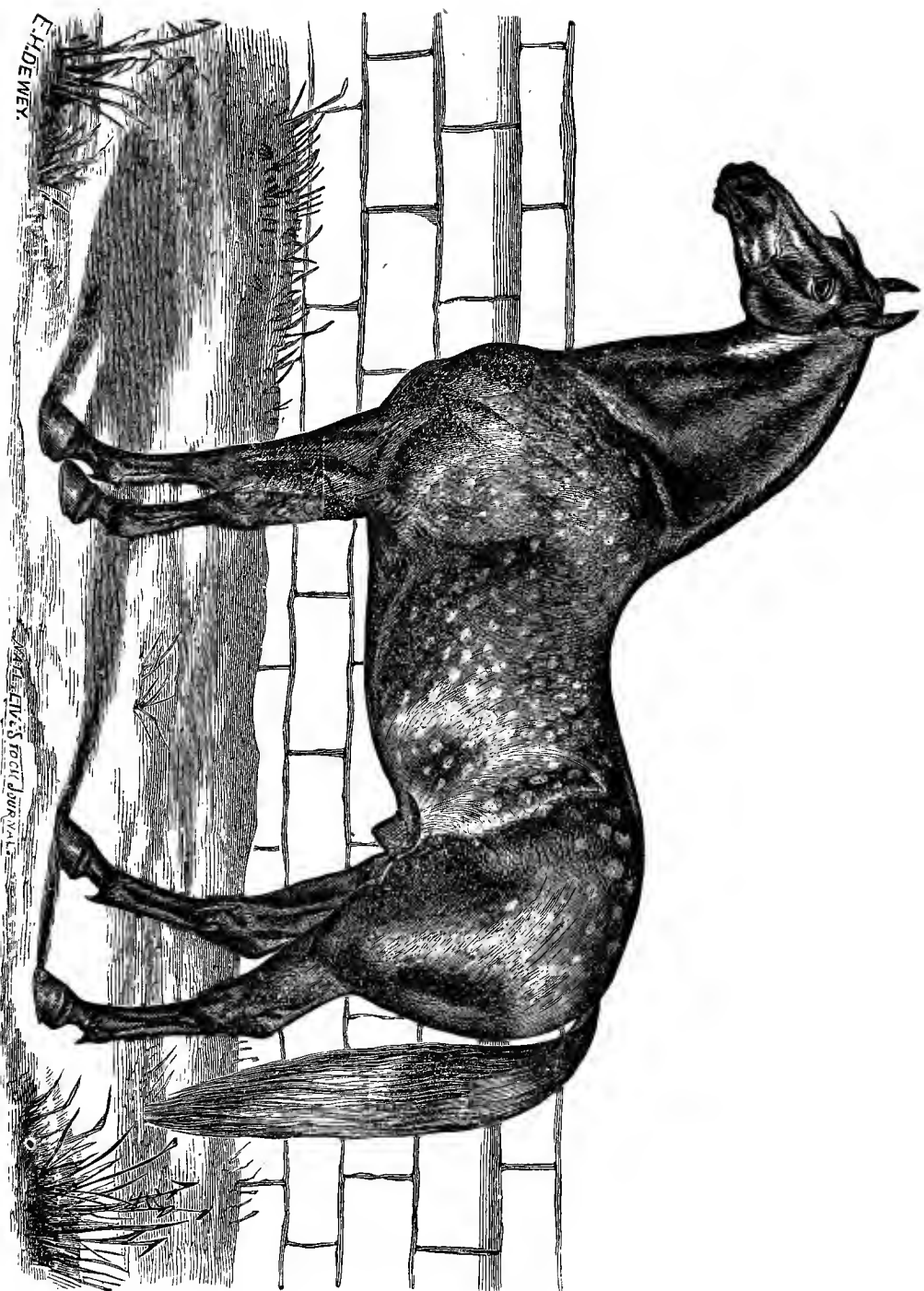
"I still hold to the opinion I expressed to you years ago, that our common horses will be materially improved by this cross. The colts have higher action than their dams, and generally keep their feet better under them.

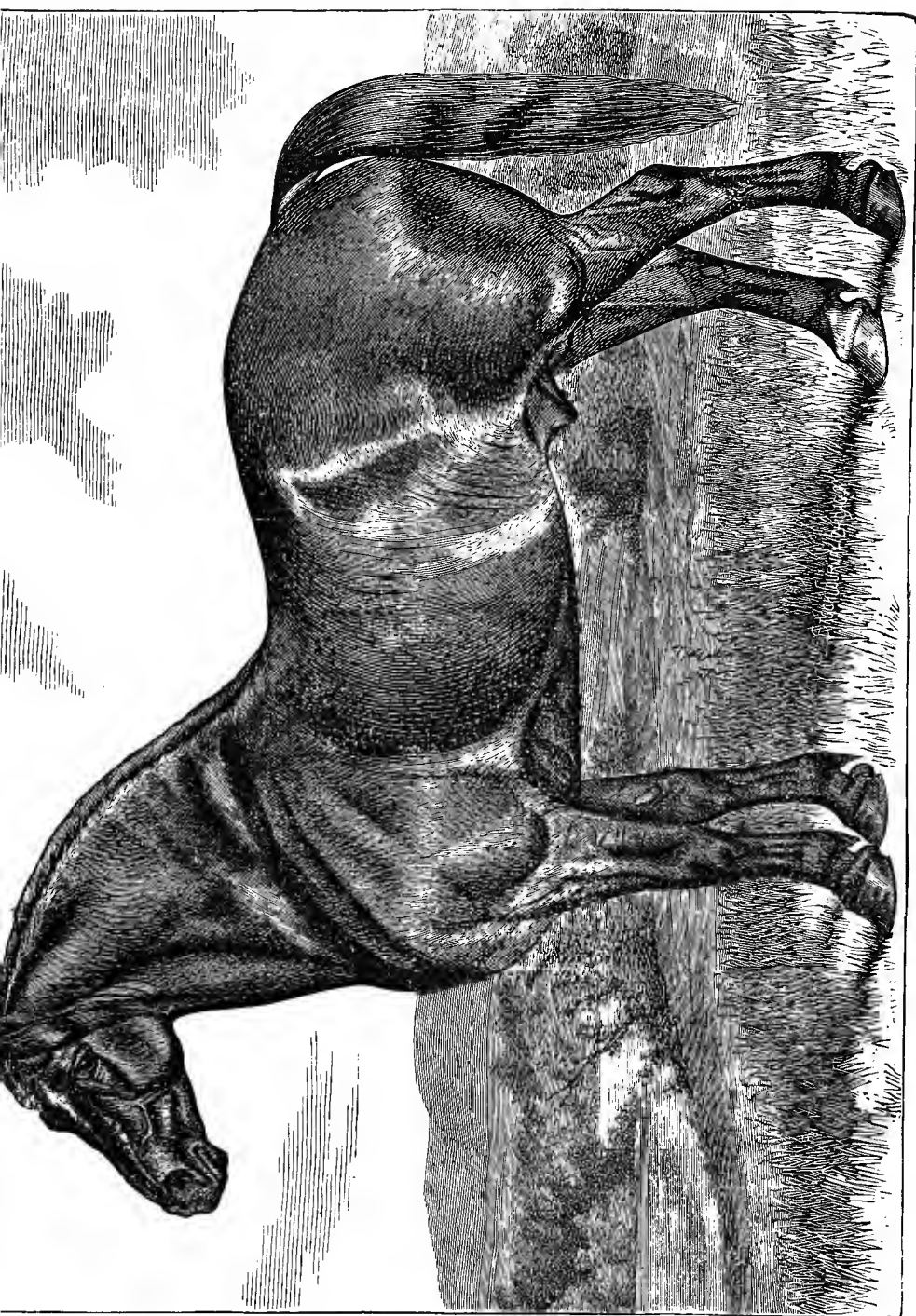
"I may safely say they are universally docile and kind, at the same time spirited and lively. They break in without any difficulty.

"As regards their speed, I do not know of any that can be called *fast* horses, though *many smart* ones among ordinary road-horses.

"I am decidedly of the opinion that we cannot do better, if we wish to produce, in reasonable time, a most valuable race of horses for the farm and road, than to breed from a full-sized Percheron stallion." (See cut on opposite page of half-bred stallion "Napoleon III.")

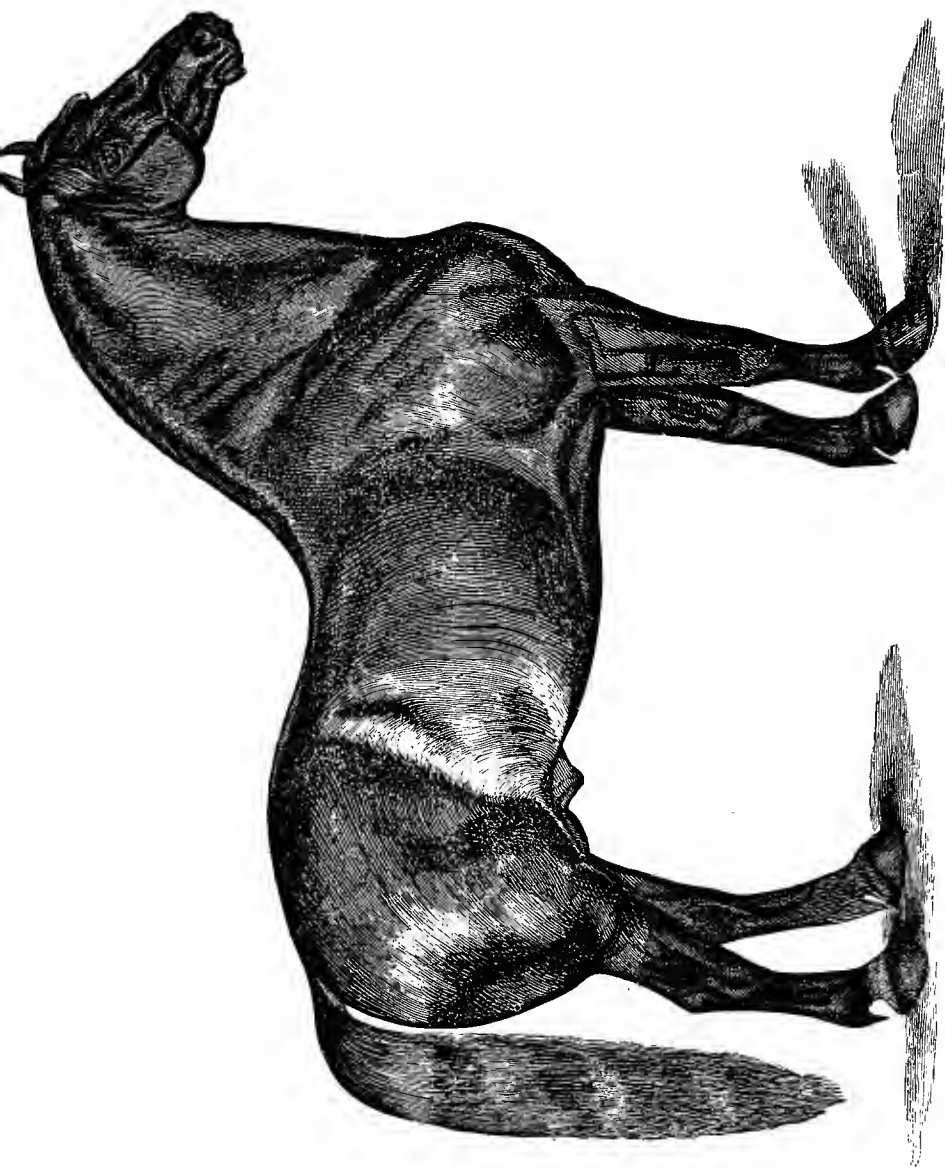
This importation by Mr. Harris was not at once followed by many others. Not until 1851 do we have any record of any other; when Mr. Fullington, from Ohio, while travelling in France for his health, became so favorably impressed by their valuable qualities exhibited upon the diligence and in the mammoth carts of Paris, that he determined to secure one before





his return home, and try the experiment of the cross upon the common mares used by him upon his own farm. He made a purchase of a gray three-year-old, compactly built, deep shoulders, long quarters, rump flat and square, back short, body round, head medium size, good eyes, ears small and erect, neck rather short, with heavy crest. He was heavy built, with considerable hair on his legs, fiery, muscular, with action one would scarce expect to see in a horse of his build and weight. He named him "Louis Napoleon." When matured, his height was sixteen hands; weight 1,650 pounds. He shipped him upon a sail-vessel; and in the usual time, without material accident, he was landed in New York, and arrived safely at Mr. Fullington's farm. He attracted very little attention at first, being in bad plight from the effect of the voyage. Being only partially developed and poor, with mane and tail almost all rubbed off, he no doubt presented a decidedly rough appearance. At least, Mr. Fullington and his *horse* became the subjects for many jokes.

He, however, had faith in his value, and at once set about proving it. He served all his own mares and a few others, and then impatiently awaited the results; for he knew that the impression made by the colts was the hinge upon which the reputation of his horse would turn. The results proved more satisfactory than his most sanguine expectations had conceived. They were remarkably uniform in build, blocky and active, and at four months old were complete little horses, just filling the eyes of the people. His mark was made. He soon sold a half interest in "Louis Napoleon" to Mr. Cushman for one thousand dollars, who afterwards bought the other half for a like amount, and brought him to Illinois in 1856, where he was afterwards purchased by the Messrs. Dillon, — the present importers and breeders of the stock, — to whom the people of the West are greatly indebted for the very energetic manner in which they brought before them the value of this breed, by the continued exhibition of the stock at the fairs throughout the country. From the very first "Louis Napoleon" established a reputation for himself as a remarkable breeder; demonstrated the value of the French cross beyond a cavil, and laid the foundation of the fame to which that breed has since attained.



"ST. LAWRENCE."

Sire, Percheron Stallion, imported by the Vercheres Co. Stock Co., Canada.

Dam, St. Lawrence and Clydesdale. Age, 5 years; weight, 1540 lbs; color, dark brown.

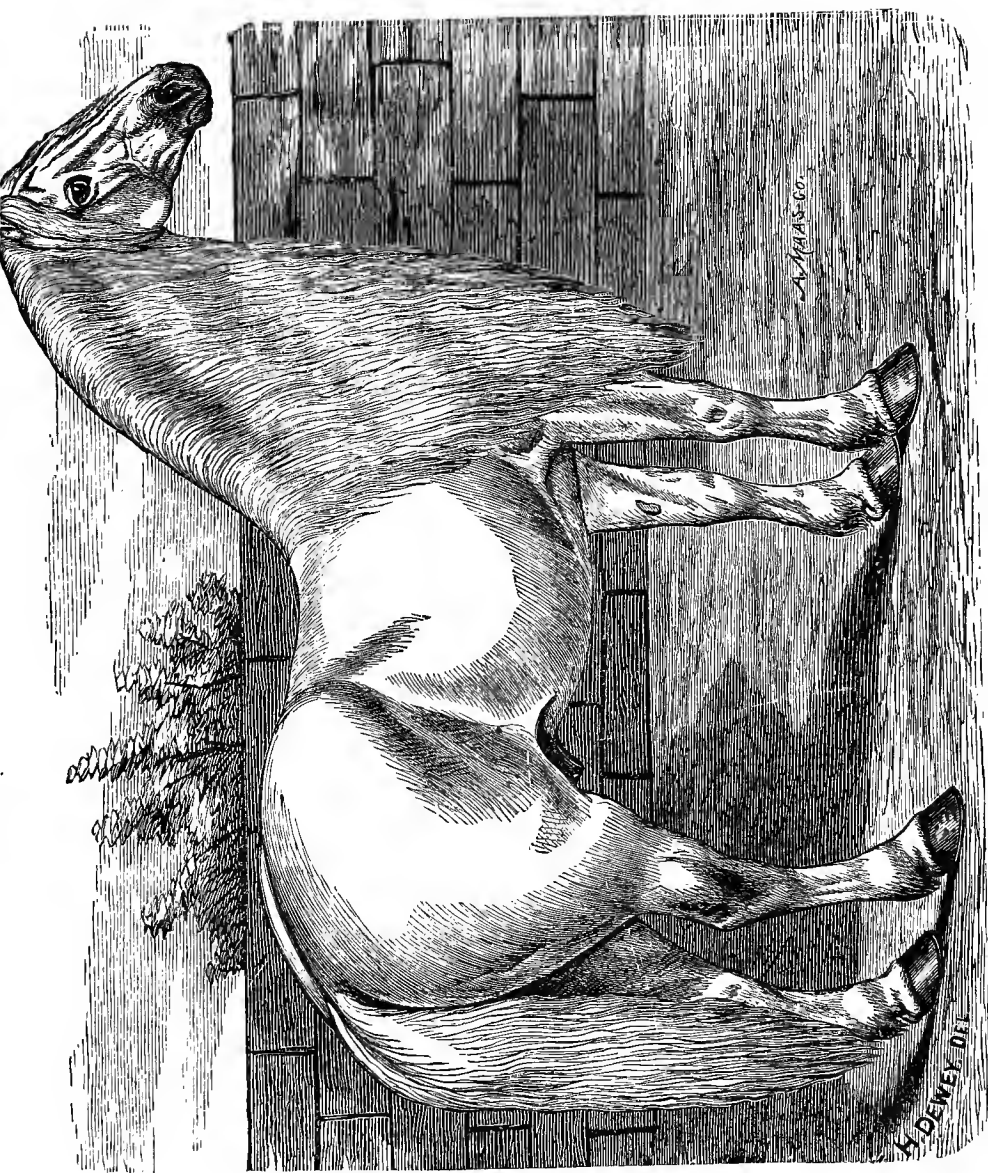
He will stand permanently at "Virginia Stock Farm," Sussex Co., Va. Terms, \$20.00, payable in cash or secured notes at time of service.

The colts of "Louis Napoleon" gave such unbounded satisfaction in Ohio, — being very uniform in build, so gentle and tractable, yet spirited and active, so hardy and easily kept, — that they determined to secure more of the same breed; and within a short time several stallions were imported from France into that locality, all of which proved excellent breeders. One of them, belonging to Dr. Brown, known as "Pleasant Valley Bill," and another belonging to a company, and called "None-such," or "Old Bob," strongly contested the laurels of "Louis Napoleon" for the supremacy as breeders.

Another stallion, named "Rollin," imported by Gordon & Martin in 1856, was purchased by James L. Owen and others, of Illinois, for their own use. He died in his prime, but left a lasting impression upon the horses of that locality. Although Illinois had become renowned for her fine cattle, and had made rapid strides toward the improvement of her work-horses by the introduction of such horses as "Louis Napoleon," "Rollin," and many other large horses of different varieties, — among which were "Oakley Samson" and "John Bull," both imported English draught-horses, — no importations of Percheron horses from France had taken place prior to the spring of 1868, when the initiatory step was taken by the importation of "Success" and "French Emperor," and a new field of enterprise was opened which has since assumed such grand proportions, and placed the State of Illinois so far in advance of every other section of this country in the breeding of draught-horses.

These two horses were imported by W. J. Edwards, and purchased at a cost of six thousand dollars (\$6,000) by the Fletcher Norman Horse Company, organized by M. W. Fletcher, one of the earliest advocates and breeders of large horses in Illinois.

The company consisted of farmers of this vicinity, — myself among the number, — who were determined to secure for their own breeding the very best stallions that could be obtained. The plan proved a success; and for several years the members of the company were enabled to breed to two as good imported stallions as there were in Illinois, for about the same price charged for common *scrub* horses of the country, allowing them ten per cent interest on their investment. As the prices



“SUCCESS.”

realized upon the colts were more than double (at the same age) of colts from any stallion ever before owned in the county, the benefits were too apparent to be disputed, even by those inveterate "croakers" with which every community is encumbered.

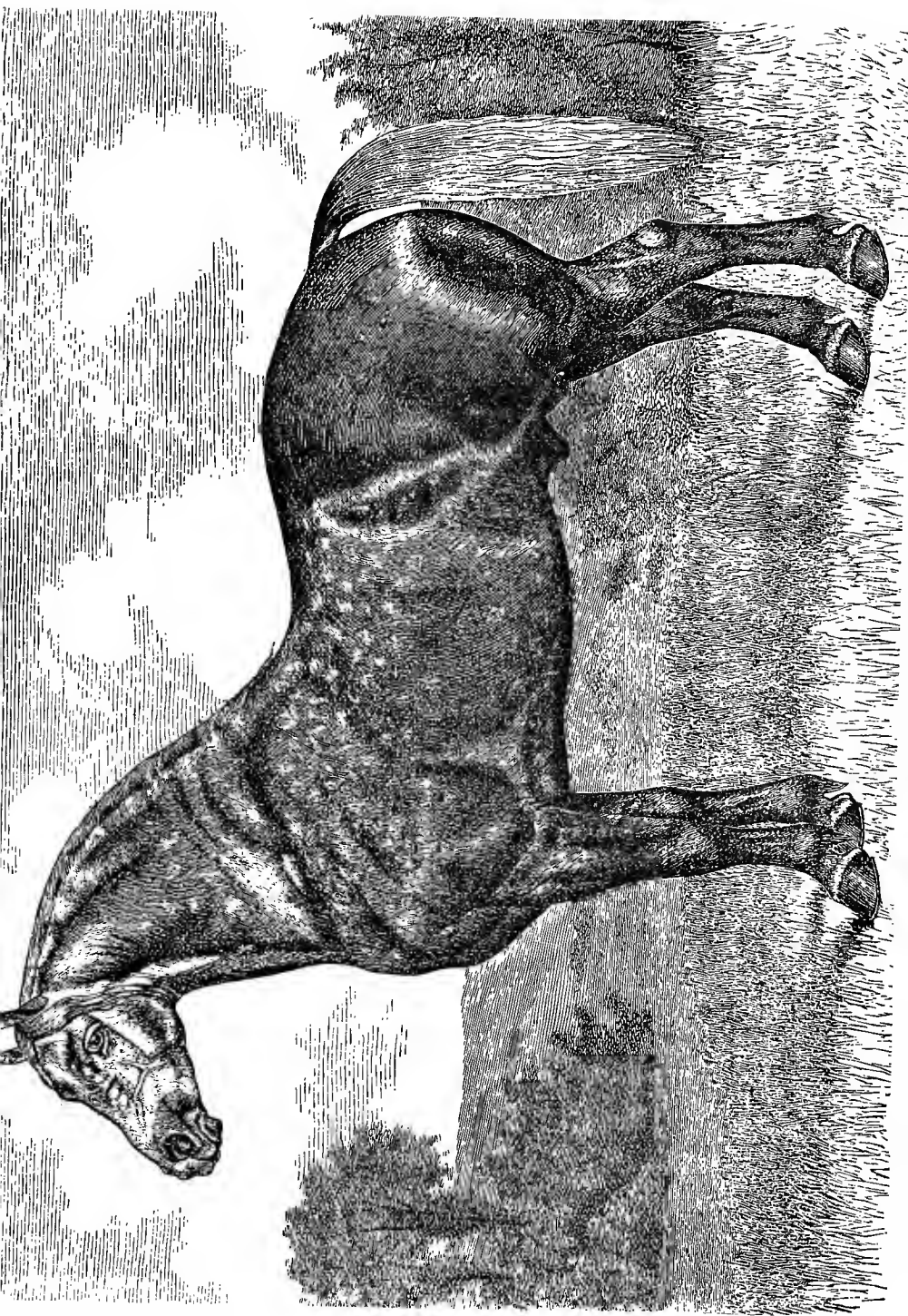
The many advantages of this plan are obvious. With a small outlay by each individual member, the stallions are purchased, cheap service of valuable animals secured, and in case of accident or death the loss falls so light upon each that it is not felt. Besides this, the united influence of the neighborhood insures *general* patronage and success from the start. For communities that are inclined to do something for themselves in the way of improvement, there is no better method.

"SUCCESS"

was purchased by me at a cost of \$3,300, and took the place at the head of my stud that he now occupies, — a position that his incomparable breeding qualities eminently entitled him to fill, and which he has successfully held against more than a hundred imported rivals, the flower of the best stud-stables of France, many, very many of them, larger, finer, and more perfect animals than himself. But those broad, flat quarters; deep, massive shoulders; that nicely-rounded body; those clean, flat, powerfully-muscled legs; that beautiful head and lofty crest from which falls that mass of silky mane reaching to the knee; that spirit and mildness of temper, — could not be forgotten. And the unerring certainty with which he transmitted those qualities to his progeny has earned for him a place in the popular favor which no untried horse, of however fine form, powerful build, or general perfection, can dispossess him of.

The stallions I have mentioned are the ones upon whose success the popularity of the breed was established; which has caused the rapid development of the importing business, which would be difficult to follow; which will be understood upon perusal of the list of animals on the following pages, imported by me since 1872.

My object in thus tracing the importations of the Percheron horse into the United States, and noticing the results of their breeding, has been for the purpose of aiding us in determining



that its success rests upon the absolute merit demonstrated by years of actual trial without a single failure. As, step by step, they have merged from the obscurity of a single importation, each succeeding one placing new evidence of its merit as a breeder upon record, until, with a steady advance from county to county, from State to State, from ocean to ocean, its fame has been heralded, its success admitted, and to-day it stands before the country the most popular of all breeds of heavy horses, and will remain so, too, as long as a large, active horse, combining spirit, energy, hardiness, with the greatest docility, capable of performing whatever work may be placed upon him as a general-purpose horse or one for draught, shall be prized.

I have often been attacked, and even ridiculed, through the columns of the press, for the stress I place upon the *action* of my horses. I have no sympathy with those gentlemen of extreme views, who think a horse must trot in 2.25 or 2.30, or weigh from 2,000 to 2,500 lbs., and not be able to move off a walk. I value a horse, of whatever weight he may be, whether 1,000 lbs. or twice that, for what of HORSE there may be in him; and if he cannot show a good, easy *trotting action* as well as a *good walk*, and that, too, in a good, lively, spirited manner, he has no attractions for *me*. I want no automatons, *no wooden horses*.

And to all who may chance to visit Oaklawn, I will say, that, without encroaching on the prerogatives of the trotters, I will show *large* horses whose *performances* as well as *appearance* will please.

COTSWOLD SHEEP.

CHAPTER I.

WINNING FLOCK, LATE MAPLESHADE FLOCK.

I HAVE long been an admirer of Cotswold sheep, and have been anxious to possess the *best flock* in America. It had long been conceded that the Mapleshade flock of Moreton Farm, Rochester, N.Y., belonging to Joseph Harris, was superior to any other flock of Cotswold sheep in America; and Mr. Harris says they are better than any imported Cotswolds he has ever seen. They have repeatedly taken the first prizes at the New-York State fairs when there was great competition.

Mr. Harris is the well-known author of "Walks and Talks," "Harris on the Pig," "Talks on Manures;" and his last, and I had almost said best, work is his unique and original "Seed Catalogue," which everybody ought to send for on account of the useful and practical suggestions which are thickly strewn upon every page. He would, however, rather you would order a few seeds with which to try his suggestions, than to ask for the catalogue solely for the valuable advice, "How to Make Good Crops," which it contains. I have read the catalogue, and tried his seeds, and they are both good.

When his catalogue came out last year, offering every sheep in the flock, I decided that the "Mapleshade flock," or rather all the cream of it, was coming east. "Westward the star of

empire takes its way;" but eastward the champion Cotswold flock has come, and now they are the "WINNING flock."

The following history of this remarkable flock of sheep is from the pen of Joseph Harris himself.

COTSWOLD SHEEP. — MAPLESHADE FLOCK.

This justly celebrated flock of high-bred Cotswold sheep was brought to Moreton Farm, seven miles west of Rochester, N. Y., on the Buffalo road, in 1869. It was imported by J. D. Wing, of Dutchess County, N. Y., from the best breeders in England.

A careful record has been kept, and a complete history and pedigree of every sheep in the flock can be given. It is believed that there is no Cotswold flock of sheep in the world that is better bred, and certainly no Cotswold sheep whose pedigree is more complete or more thoroughly established. Every sheep in the flock has a pedigree tracing back, on the side of both sire and dam, to the best and most distinguished and reliable breeders in England.

Large prices were paid, and great pains taken to select the very best and purest-bred Cotswold sheep that could be found in England; and, as stated before, a perfect record has been kept of each individual sheep since they were brought to this country. The sheep are all numbered with C. H. Dana's metallic tags in the ear. The date of service is kept; the date of birth, and the *weight of each lamb* at birth, and at different times afterwards, are all systematically kept; also the weight of every sheep every year at shearing time, and the weight of the wool.

The wool has also at several times been examined by experts, and their opinion of the relative value of the fleece obtained as a guide.

The sheep are not bred merely for "fancy points," but for really intrinsic merit in form, early maturity, vigorous constitution, fattening properties, and *quality* of wool. The flock is in *perfect health*. The sheep are thoroughly acclimated; they have not been forced; they are kept for use, for real value, and not for show; they are not housed in winter; they have sheds

to run under, but spend most of the time in the open air. If well fed, and provided with dry quarters under foot, there are no sheep that will stand exposure to our severe winters better than the Cotswolds.

The Cotswold ewes are good breeders and good nurses. They frequently have two strong lambs, and occasionally three, at a birth. I have never had a pure-bred Cotswold ewe in the flock that would not breed. We let the ewes have their first lambs when two years old, and they frequently continue to be good breeders till ten years old.

The Cotswolds are the hardiest of all the English breeds of sheep.

Of all well-established breeds, the Cotswolds are *the largest*.

The celebrated experiments of Lawes and Gilbert proved beyond all question that the Cotswolds produced *more mutton and more wool* than any other breed. In other words, they gained more rapidly both in fleece and carcass than any other breed; and not only this, but they gained more *in proportion to the food consumed* than any other breed.

There is a great demand for Cotswold rams, and it is rapidly on the increase from year to year. Last year a Cotswold breeder wrote me that the demand in the Southern States was so large that he had not been able to fill more than half his orders.

The fact is, there are very few breeders of *pure-bred* Cotswold sheep, either in England, Canada, or the United States.

Last spring Gen. Horace Capron of Washington received an order from the Japanese Government for a hundred and thirty-eight Cotswold ewes and four rams, and for fifty-six merino ewes and two rams. He found no difficulty in getting merinos, but it was by no means an easy matter to find Cotswolds. He took all the yearling ewes I had to offer him, and two yearling rams.

If you doubt that pure-bred Cotswold sheep are scarce, see how many flocks you can find in England or in Canada or in the United States, where the sheep are numbered, and a record kept of their breeding.

Now that we have in this country a Cotswold record, we may

expect that more attention will be given to the pedigree of Cotswold sheep. The weak point in regard to it is, that the English breeders are not placed on the same footing as the American breeders.

An English sheep with no number in his ear, or any other mark to designate him, is accepted at once, simply because he is "imported," while we know nothing in regard to his pedigree.

I make these remarks in justice to those American breeders of Cotswolds who take pains to number all their sheep, and give an accurate record of their breeding.

We are expected to exhibit at the fairs none but pure-bred sheep, while we may have to compete with imported sheep that are merely splendid-looking "cross-breds" or "grades."

Knowing the breeding of my pure-bred Cotswold sheep, I feel justified in saying that they are far more valuable than the general run of imported sheep. I think one of my high-bred Cotswold rams will prove a more potent sire than one of these promiscuously bred rams, whose only pedigree consists of the one word "imported."

I have no objection to an imported sheep. In fact, I should be glad to use one in my flock, if I could find one that had *as good a pedigree as those I now use*; but I have never yet happened to meet with such a sheep! Look at the pedigree furnished with the next imported Cotswold sheep you hear of. Possibly it will tell you that it was sired by such a ram; but what the ram was, or what the dam or grand-dam was, it would be useless to inquire.

MORETON FARM.

ROCHESTER, N.Y., Feb. 13, 1880.

JOHN M. BAILEY, Esq.

Dear Sir,—Your favor of the 11th has just reached me. I am in Rochester, and have not access to my books to refer to the numbers you quote. But I will say this, that, if there is a single sheep in the flock that you prefer to those sent you, I will gladly exchange.

I can assure you upon honor that you have got all the best sheep; that you have not a pure-bred Cotswold ewe in your flock that is not better than any pure-bred Cotswold ewe (except lambs) I have.

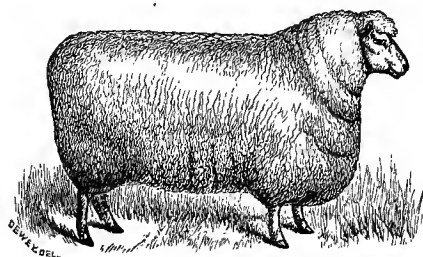
I feel badly enough that you have got all my best ewes. My only chance lies in my last-year lambs. With them I still hope to compete with you; but that will not be till the fall of 1881. Next year you will have the field to yourself.

But I have no objection to your publishing the fact that you have purchased all the *best* ewes in the Mapleshade flock. In point of fact, there is no choice about it. You have *all* the best sheep in the flock.

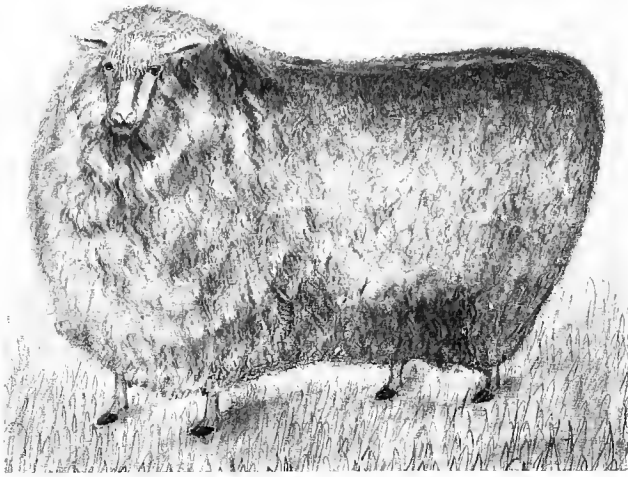
Respectfully yours,

JOSEPH HARRIS.

The foregoing history, with this letter from Mr. Joseph Harris which I publish by permission, proves beyond question that the "Winning flock" is without a peer.



WINNING ANNA.



"PRINCE."

Three years old. Weight, 302 lbs.
First fleece, 12½ lbs.; second, 18½ lbs.; third, 17½ lbs.



"PRINCESS."

Weight, 195 lbs. Sheared, 13 lbs.

CHAPTER II.

DESCRIPTION OF THE "WINNING FLOCK."

THE heliotype from a photograph is a capital representation of "Prince," who is monarch of the flock.

"Prince," No. 630, was born March 2, 1877, and is consequently three years old. His first fleece weighed $12\frac{1}{2}$ pounds, second fleece $18\frac{1}{2}$ pounds, third fleece, May 1, 1880, $17\frac{1}{2}$ pounds; his weight at shearing time last year was 230 pounds. He has grown a great deal since then; and now, although only in breeding condition, he weighs 302 pounds. The many hundred visitors who have come to Winning Farm to see the Ensilage have *without exception* declared him to be the best Cotswold buck they have ever seen, and that his fleece is the heaviest, the finest, the most lustrous, and the most desirable they had ever met with.

He is handsome, remarkably good form, stylish head, strong constitution, and has a perfect pedigree. He is not for sale, but will remain at his post the chief of Winning-Farm Cotswold flock. I shall have a few of his ram lambs for sale this fall. Those who have 25 or 30 ewes which they desire served the last of October next will find a good strong ram lamb will give them the best of satisfaction.

Among my breeding ewes, there are none I prize higher than "Lady Brutus," No. 30. She is a noble ewe, weighs 211 pounds, shears $12\frac{1}{2}$ pounds. On the 21st of February she had a pair of ewe lambs which weighed when dropped 21 pounds. When three weeks old they weighed 48 pounds. When five weeks old their weight was 32 and 34 pounds,—66 pounds

the pair. When eight weeks old they weighed 92 pounds, and are as "like" as two peas.

No. 675, "Princess 2d," is not as large as some; but she yields to none as a breeder. She weighs 165 pounds. Sire, "Victor;" dam, "Princess." She had a ewe lamb April 2, which weighed $15\frac{1}{4}$ pounds when dropped. Weight, when six days old, 21 pounds.

No. 201, "Winning Anna," is one of the best ewes in the flock, and very handsome. Her pedigree is absolutely perfect. Sire, "Young Gloster;" dam, No. 48, by imported "Golden Fleece." Grand-dam imported.

She had on March 24, a magnificent ewe lamb, weighing, when dropped, $14\frac{1}{2}$ pounds. I paid Mr. Harris, before the advance in sheep and wool, \$60 for "Winning Anna." I would not sell her lamb for that and \$10 added to it, for I believe it will make one of the finest ewes in the world. I shall have no ewe lambs for sale, as I want to increase my flock, and shall therefore keep all the fine ewe lambs, and the poor ones, if there chance to be any, I will not sell for breeders. I am resolved that no animal shall leave Winning Farm as a breeder that is not superior. Persons from a distance can order just as well by mail as in person: describe what you want; if I have it, and it is for sale, I will write you, giving you the lowest cash price. If I have not got what you want, I shall not try to persuade you that an inferior animal will answer. Of course there will be degrees of excellence in the stock I shall offer; but what I mean is, that no inferior animals will be sold for breeders from Winning Farm. They will be castrated, or sent to the shambles.

I wish I could describe every ewe in "Winning flock." I spend hours every day with my sheep, cattle, horses, colts, and pigs. I believe I get more enjoyment from seeing them happy and comfortable, their wants all supplied, the most suitable food fed to them at suitable intervals, than is offered by all the pleasures of metropolitan life.

By the way, the correspondent of "The National Live Stock Journal" called upon me a few weeks ago: I told him the story of Ensilage, and later took him to the barn to prove what I

had said. In one pen were four Cotswold ewes. I first put into their feed-troughs some oats and bran mixed: they began eating greedily. I then put some Swede turnips in: two of them left the grain, and took hold of the roots. I then took a double handful of Ensilage, and threw it into the trough: every one left their grain or turnips, and all crowded and fought each other for the Ensilage. The young lambs eat it before they are two weeks old. I do not believe there is any thing equal to it for young calves.

Let me say right here, that, judging from the growth which young cattle make in winter, when fed upon Ensilage and wheat bran, colts can be raised upon improved Ensilage at one-quarter the cost of raising them upon hay, grain, and roots. My horses prefer corn Ensilage to carrots. The growth they will make in the winter will exceed the summer's growth upon the best of pasturage.

CHAPTER III.

COTSWOLD-MERINOS.

I BELIEVE that the great forte of *pure* Cotswold rams is to be used on merino ewes. Joseph Harris was the first to systematically try this cross. I will let him tell the story himself. He can write better than I can anyway.

"I am decidedly of the opinion that the 'coming sheep' of this country will be what I take the liberty to call American Cotswolds. I have hitherto called these sheep "Cotswold-merinos:" this designates their origin. But the time has now arrived when the name loses its significance. For instance, I have Cotswold-merino lambs with three and four crosses of pure Cotswold blood in them, and only $6\frac{1}{4}$ per cent of the native or merino sheep. The next cross will have only $3\frac{1}{8}$ per cent of native or merino blood, and the next only a little over $1\frac{1}{2}$ per cent. A few years hence American Cotswold sheep will be shipped by thousands and tens of thousands every week to the English markets. There is no reason why they are not now shipped in large numbers, except the fact that they cannot be found: we do not raise enough of them, or feed them well enough.

"In the autumn of 1869 I went to the cattle-yards in Buffalo. I bought a lot of common merino sheep that were brought in from Michigan. They were intended for the butchers. I did not select them. I took the whole lot of 205 sheep. I gave three cents per pound for them, live weight. On running them to the scales they averaged exactly 80 pounds each, so that the sheep cost me \$2.40 per head in Buffalo. I put them in the

cars, and brought them home. I selected out 145 wethers to fat. The remaining 60 ewes I put to a pure-bred Mapleshade Cotswold ram.

"These ewes were well fed during the winter, and in the spring produced 73 lambs, and we raised 72 of them. Stronger, healthier, and thriftier lambs could not be desired. I had feared that by using a large Cotswold ram on such small ewes, we should have trouble in lambing. I had been told, 'You can use a small South-down ram on merino ewes, but the Cotswolds are too large. The cross is too violent.' I may say, however, that not only the first year, but in all my subsequent experience, there has never been the least difficulty. One reason for this is, that a well-bred Cotswold, though such a large sheep, has a remarkably small head. It is very narrow between the eyes.

"The ram lambs I sold to the butchers at a good price. The ewe lambs I kept to breed from; and the next fall twelve months, when about eighteen months old, I put these one-cross Cotswold-merino ewes to a pure-bred Cotswold ram. These *second-cross* lambs were large, strong, and healthy. We had no trouble in lambing, and the ewes were capital mothers.

"These second-cross lambs, when about eighteen months old, were bred to a pure-bred Cotswold ram.

"Many farmers told me that I was carrying the thing too far. *But it is not so.* The lambs from these two-cross ewes were remarkably good, many of them as large and handsome as any pure-bred Cotswolds I ever saw.

"The third and fourth crosses were equally good.

"The first-cross sheep have 50 per cent of pure Cotswold blood in them.

"The second-cross sheep have 75 per cent of pure Cotswold blood in them.

"The third-cross sheep have $87\frac{1}{2}$ per cent of pure Cotswold blood in them.

"The fourth-cross sheep have $93\frac{3}{4}$ per cent of pure Cotswold blood in them.

"In 1877 I showed at the fair 'for exhibition only:'—

"1st, a common merino ewe with a lamb by her side. The merino ewe weighed 75 pounds. Her lamb was born March

29: he weighed, July 6, when less than three and one-half months old, 74 pounds; Aug. 8, 87 pounds; Sept. 6, 101 pounds.

"2d, No. 6, a daughter of the above merino ewe, and her two lambs, Nos. 672 and 673.

"3d, No. 16, a daughter of No. 6, and her two lambs, Nos. 617 and 618.

"4th, a pen of three-cross lambs averaging 128 $\frac{3}{4}$ pounds each.

"5th, a pen of three-cross ewe lambs.

"6th, a pen of two three-year-old ewes with two and three crosses.

"These sheep attracted much attention, and were greatly admired.

"I again exhibited this class of sheep at the New-York State Fair last year, and also at the Western New-York Fair. I feel sure that those who saw them will not be surprised at my enthusiasm. They are just the very sheep that are needed for the production of good mutton and good wool.

"The wool from one of these Cotswold-merinos, or American Cotswolds, brings a higher price than the wool from the pure-bred Cotswolds; and the mutton is of finer grain and of better quality."

CHAPTER IV.

WEIGHTS OF COTSWOLD MERINOS.

I HAVE at "Winning Farm" Cotswold-merino or American Cotswold ram lambs for sale. I recommend them to farmers who wish to raise sheep for mutton and wool. They are a hardy sheep; in the Southern States they stand the climate better than the pure-bred Cotswolds.

As proof that the *pure* Cotswold ram is *the* ram to use on merino ewes, let me cite the weights of a few cross-bred Cotswold merinos.

Ram No. 636, one-half Cotswold, one-half merino, dam weighing less than 80 pounds; two years old, and sheared 16 pounds of good wool, weighs 210½ pounds.

Ram No. 51, one-half Cotswold, one-half merino, sheared 15½ pounds, weighed 205½ pounds when two years old.

No. 628, two-cross ram two years old, three-quarters Cotswold, one-quarter merino; sheared 14 pounds, weighs 238 pounds.

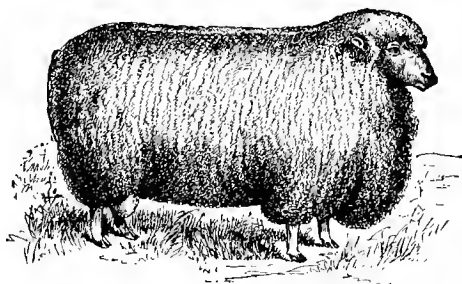
No. 909, yearling ram, three-cross, seven-eighths Cotswold, weighed at birth 14½ pounds, at one year old 197 pounds.

No. 954, yearling ram, two-cross, three-quarters Cotswold; sire, "Lord Moreton," dam No. 6, grand-dam a merino weighing less than 80 pounds.

No. 509, a three-cross ram lamb, sire a pure Cotswold, dam No. 591, grand-dam No. 6, great-grand-dam a merino; weighed at birth 14½ pounds, when three months and two weeks old, 91 pounds; sheared when one year old, 15½ pounds.

No. 2, Cotswold-merino breeding ewe at Winning Farm,

one-cross, half Cotswold, half merino, weighs 160 pounds; shears a very heavy fleece of very fine medium-length wool. A very handsome ewe, one which I am proud to show as a



THREE-CROSS COTSWOLD-MERINO RAM, "ALEXANDER," ONE YEAR OLD.
Weight 173 lbs.; sheared, May 19, 1854 lbs.

specimen of what can be produced by the use of a pure Cotswold ram upon a little merino ewe.

No. 963, one-cross, very handsome, same blood as No. 2, weighs 185 pounds, shears 9 pounds.

No. 673, a two-cross ewe, a twin, weighs 200 pounds, shears 15 pounds of fine lustrous wool over twelve inches in length. Last spring she had for her first offspring a fine pair of twins, this spring she has another fine pair. She is a remarkable ewe, and attracts attention even in a flock of as fine pure-bred Cotswolds as the "Winning flock."

There are millions of merino ewes in the United States. If pure Cotswold rams were used for two crosses, their value and the value of their clip would be doubled. There are only two things that prevent its being done: first, the owners of the merinos do not know the great advantages of the cross; and the next is, that there are but very few *pure* flocks of Cotswolds in America to obtain rams from. I shall have a number of ram lambs (pure Cotswolds) for sale in the fall. A good, strong, vigorous lamb is just as good as an older ram for 20 to 30 ewes. I shall also have quite a number of Cotswold-merino one-cross ram lambs: they are worth more than pure Cotswold rams to use upon the common bare-bellied sheep of the South. They are large, short-legged, and covered all over with a dense fleece

of fine wool of the best quality; characteristics that cannot fail to improve Southern sheep.

Correspondence solicited in regard to sheep and other stock.

WEIGHT OF PURE COTSWOLDS AND THEIR FLEECES.

No.	DESCRIPTION.	POUNDS OF WOOL.	WEIGHT OF SHEEP.
630	Prince	17 $\frac{1}{2}$	302
509	"Alexander," 3-cross ram, 1 year old .	15 $\frac{1}{2}$	173
30	"Lady Brutus"	12 $\frac{1}{2}$	205 $\frac{1}{2}$
645	. . . . .	11 $\frac{1}{2}$	180
605	. . . . .	11	159
296	. . . . .	13 $\frac{1}{2}$	195 $\frac{1}{2}$
290	. . . . .	9	150
588	. . . . .	11 $\frac{1}{2}$	155
629	. . . . .	11	165
124	8 years old	11	166
638	. . . . .	9 $\frac{3}{4}$	184
427	. . . . .	9	217
201	"Winning Anna"	11	181
654	"Princess"	13	195
675	"Princess 2d"	12	175
962	. . . . .	12	155
683	. . . . .	9	115
676	. . . . .	12	135
274	. . . . .	10	176
622	"Lady Lawson"	16	198
32	"Lady Hill"	10	181
680	. . . . .	11	145
2	. . . . .	11	148 $\frac{1}{2}$
270	. . . . .	12	178 $\frac{1}{2}$
502	. . . . .	12	143
241	. . . . .	14	165
685	One-cross	8	155
673	2-cross ewe	15 $\frac{3}{4}$	190

Average weight of Cotswold sheep, May 19 171 lbs.

" " fleece 11 lbs. 7 oz.



THE REPRESENTATIVE OXFORDSHIRE-DOWN, "FREELAND."

Weight, 425 lbs. Imported and owned by T. S. Cooper, Linden Grove, Coopersburg, Penn.

CHAPTER V.

OXFORDSHIRE-DOWNS.

LAST fall Mr. Theodore M. Norton visited "Red-Gate" Farm, Newton, N.J., owned by Henry C. Kilsey, Secretary of the State of New Jersey, and purchased for me all the ewe lambs he had, also a very fine yearling ram, "Grand Duke of Oxford."

The Red-Gate Oxfordshire-down flock originated as follows:—

The ram "Duke of Oxfordshire," and two ewes bred by Mr. A. J. Milton Druce, of Twelve Acre Eyresham, England, and twelve ewes bred by Mr. John Treadwell, of Upper Winchendon, Aylesbury, England. They were imported by Mr. T. S. Cooper, and purchased from him by Mr. Kelsey in 1875, for \$1,800. Their produce of 1876 and 1877 has also been retained.

In England the Oxfordshires were first exhibited at the royal show at Windsor, in 1851, by Mr. John Gillet, of Brize Norton, but were shown at the local shows for some years previous to that; and they have steadily gained in favor from that time. They were first known in America about the year 1859, a few of them being then imported by Mr. Thomas Motley of Massachusetts. They have been gradually improved in England by the careful and judicious breeding and management of the Duke of Marlborough, the Messrs. Druce, Gillet, Howard, Treadwell, and others, and are believed to combine more good qualities for American breeders than any other sheep hitherto known here.

Mr. George Gardner, now of Canada, an intelligent English

farmer of large experience, wrote to "The Country Gentleman" in 1870 in regard to the Oxford-downs as follows:—

"Having a thorough knowledge of the Oxford-downs, from living within a few miles of the part where this breed was originated, I can state positively that there is not a more profitable variety in existence. These sheep are a complete answer to all those who will not allow that good ever arises from crossing, as they were a direct cross between the Cotswold on one side and the Hampshire-down on the other; and the Oxford-downs are now an established breed, and continue to be distinct, and follow true to parentage without any uneven look in the flock which will occur at the commencement of a direct cross between two pure breeds. . . . The Oxfordshire-down is decidedly the largest of all the Down species, and cuts more wool. And the reason that they continue to gain favor in England is that the mutton from any kind of Down sheep makes more per pound, and is always more readily sold; and the Oxford-down lies better within hurdles, and comes to very early maturity, — also cuts a heavy fleece, as well as being of superior quality. Any one may depend upon them for being a very profitable breed if well fed; for they will cut 10 or 12 pounds of wool at 14 months old, and weigh 120 pounds, dressed weight, on turnips and hay, if the hay is cut when the grass is coming into bloom."

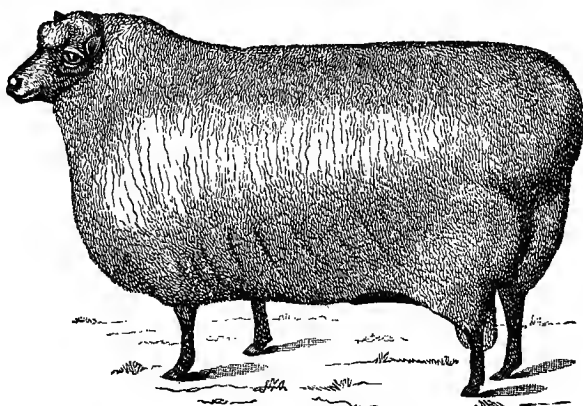
In a letter by Mr. Gardner in December, 1876, he reiterates his commendation of these sheep, and says, "They certainly combine all the best qualities of wool and mutton in existence; as there is the desirable dark flesh of the original Down, with the bulk of the Cotswold, and there is the weight of the wool with the finest quality possible."

The prices for Oxford-downs have advanced from year to year in England. At Mr. Howard's first sale in 1865, 57 rams made £12 each; in 1873 his average for 63 rams reached nearly £16 each, — about \$85 currency. In 1875 his average for 60 head was £17 6s. 6d., or over \$95 each. In July, 1876, at Mr. Druce's annual sale and letting, 46 yearlings averaged £16 each, single rams fetching 51, 44, 30, and 26 guineas, &c., while Mr. Cooper paid 85 guineas, or *nearly \$500 currency, for*

the use for the season of 1876 of the two-year-old ram "Free-land," and all expenses of passage to and from America, insurance, &c.

At the annual show in December, 1876, of the Smithfield Club, of fat cattle in London, a pen of Oxford-down wethers won the £40 cup for the best pen of sheep of any breed in the show, beating the South-downs, Shropshires, Lincolns, and all others. They were sold to the butcher at £9 each.

I have no pure Oxfordshire-down sheep or lambs for sale, but I shall have this fall Oxford-merino ram lambs for sale. These Oxford merinos are the progeny of 60 heavy-wooled Vermont merino ewes by my Oxfordshire-down ram.



"GRAND DUKE OF OXFORD."

CHAPTER VI.

IMPROVING SOUTHERN SHEEP. — HOW TO USE OXFORDS AND MERINOS.

THE following written for "The Country Gentleman," and copied quite extensively by the agricultural press of the South, gives my idea of the special use for which this cross is pre-eminently adapted :—

EDITORS "COUNTRY GENTLEMAN," — I enclose a sample of wool from my Mapleshade Cotswold ram "Prince." He is two years old; sheared $18\frac{1}{2}$ pounds last spring, and in breeding condition weighs 300 pounds. I have just examined this sample under a microscope magnifying 600 diameters. It is $9\frac{1}{2}$ inches long and $\frac{1}{6\frac{1}{50}}$ of an inch in diameter. I also send a sample (from a wether lamb dropped May 1, 1879; sired by a pure Oxford-down ram and out of a common coarse-wooled native Kentucky ewe), which is eight inches long and $\frac{1}{7\frac{1}{50}}$ of an inch in diameter. Sheared May 19, 1880, 11 pounds, and weighed 128 pounds.

I believe the Oxford-down is the best ram of all the pure breeds to use on those long-legged, bare-bellied sheep of the South. He will cover them with long and fine wool of the best quality, and improve their size and the quality of the mutton. Still I think they will be a little too leggy. I am trying an experiment to obviate that, and at the same time lessen the expense of improving a flock. Last fall I bought 84 of the best Vermont merino ewes I could find. I have bred 60 of these to my Oxford-down ram, the "Grand Duke of Oxford." By this cross I expect to get a sheep of strong constitution, covered

with a dense fleece of fine silky wool of medium length. I hope to get a sheep which will be exactly adapted to improve both the fleece and the carcass of the common mountain sheep of the South. These mountain sheep (the common sheep of the South) are long-legged, and shear about $1\frac{1}{2}$ to $2\frac{1}{2}$ pounds of coarse, dry, harsh wool, which grows only upon their sides and backs. By the use of an Oxford-merino ram (as I will term this cross-bred animal) upon a flock of the above common sheep, I expect to get a sheep with a fleece worth more money than that of the merino grand-dam, and at the same time mutton will be produced, instead of the superabundant yolk and oil with which the fleece of the merino is filled. What the South needs is a mutton as well as a wool-bearing sheep. They now have neither.

The demand for mutton is rapidly and steadily increasing, both for home use and foreign consumption. Choice mutton sheep are quoted in the London markets at 6s. 4d. to 6s. 6d. for eight pounds. This is equivalent to 18 to 20 cents per pound. The common sheep of the South can be improved so as to shear from six to ten pounds of first-class wool, and weigh 150 pounds at two years old, as my Oxford-down grade lamb proves. The two fleeces would then pay handsomely for his keeping; and the breeder would have at the end of two years — costing him less than nothing — a sheep worth from \$12.50 to \$15 in the English markets. European steamers run direct from Norfolk, so that the sheep-raisers of the South Atlantic States have advantages shared by those of no other section. In no other way can so much money be made upon the investment, and at the same time the fertility of the soil be restored and improved, as by keeping sheep. I am by no means certain in my own mind, but that it would be a better plan (and I intend to try it on my Virginia Stock Farm) to breed these mountain sheep once to a pure Vermont merino. This would cover the lambs with wool, shorten their legs, and double the value of the fleece. Then breed these cross-bred merino ewes to a pure Oxford-down ram to get the mutton carcass.

The difficulty in getting the Southern sheep-owners to try this way to any considerable extent will be the expense of pro-

curing pure merino and Oxford-down rams, and the necessity of keeping both kinds until all the old native ewes have been replaced by improved ones. If the first plan will accomplish as good, or nearly as good, results as the latter, many will adopt it. The cost of an Oxford-merino ram, in whom the two pure bloods are blended, will be no greater than that of a pure merino ram ; and if through his use the good qualities of both the merino and Oxford-down can be made to take the place in his lambs of the inferior qualities of their dams, time will be gained (the old stock will answer to breed from until displaced by a large number of grades), and the expense for a pure Oxford-down ram saved.

An Oxford-merino ram (a cross between the two pure breeds) can be sold so as to cost the purchaser somewhere from \$10 to \$20, according to age, size, quality, and transportation charges. A pure merino ram would cost as much or more. Then, in order to get a first-class mutton carcass underneath the wool which the merino cross would give, a pure-bred Oxford-down ram will be necessary ; and he will cost from \$50 to \$100. This expense can be saved if my Oxford-merino cross possesses sufficient prepotency to stamp the good qualities which it must possess upon the progeny. There are thousands of sheep-owners in the Southern States who would try to improve their flocks if it involved no greater expense than \$10 to \$20. They well know that a Cotswold cross will do no good upon their sheep. The South-down improves the carcass, but does not increase the value of the fleece much ; and pure Oxford-downs are too scarce and too high-priced.

CHAPTER VII.

CRITICISM UPON THE OXFORD-MERINO CROSS, BY A VIRGINIA FARMER.

IN your issue of March 6, you publish a communication from Mr. J. M. Bailey, which, to some extent, is very commendable, in regard to improving Southern sheep. I am very glad that he has undertaken to do on a large scale the same thing that I have been doing, successfully too, though on a small scale, for a number of years ; and I have been doing it in the very same way that Mr. Bailey intimated by saying "the people know that it cannot be done." I do not wish to enter into a controversy with Mr. Bailey in regard to a cross between the Cotswold and our native sheep ; for I wield the plough and hoe much better than the pen, and I reckon he would do better with the latter. Theory is good, but practice is better ; and if Mr. Bailey, or any other man that has got the idea into his head that the Cotswold is not a good cross on our native Southern sheep, will visit me, or some of my neighbors that I have furnished rams, they will be satisfied that it is a good cross, and, if I am not mistaken, a better one than Mr. Bailey's Oxford-merino will be, for the reason that his merino has the same fault that our native sheep have ; and that is, they do not give milk enough for their offspring ; and this fault the Cotswold remedies, and possibly the Oxford-down may. As I have had no experience with the Oxfords, I cannot say they will not ; but with my limited knowledge, having seen quite a number of them, I judge they are too closely allied to the South-down, which are the poorest milkers known, not excepting our native sheep, to rem-

edy this great fault ; for, without plenty of milk, it is impossible to make a good lamb or sheep. This fact has been too much overlooked by sheep-raisers, for if a lamb once gets poor when young it rarely ever makes the sheep it would had it not been stunted ; and it is a fact that is conceded by all sheep-raisers that know the different breeds, that the Cotswold excels all others in nursing their young. In fact, they take the place among sheep that the Ayrshire does among cattle.

So I would advise all of my brother-farmers that keep sheep (and those that do not, to get some), to cross a Cotswold ram with their common ewes, save the best ewe lambs ; then in the fall after they are one year old (for if put to breeding young it will hurt their growth, and hinder them from maturing as they should), cross them with a Cotswold ram, and save the ewe lamb. Cross another Cotswold ram with them, one that is no kin (for in-breeding is ruinous), and you will have a sheep that you will be proud of ; for they will give milk for their lambs, and will give you from six to nine pounds of wool each (not yolk or grease.)

[To get some sheep is good advice, but to try this cross will require six years, two years for each cross. A far better cross would be to use a pure merino ram, then breed the ewe lambs when about eighteen months old to a pure Cotswold. By this I think better lambs than Mr. Burgess's three-cross native Cotswolds could be obtained. I am certain they would be as heavy, shorter-legged, and shear more and better wool : besides, two years' time will be saved. While I do not think the Cotswold a good cross to use upon Southern sheep, the poorest of all crosses would be to use a grade Cotswold buck out of a common Southern ewe ; without extra care the progeny would be meaner than the original ewes. — J. M. B.]

Then, after grading your ewes up to three-fourths Cotswold, use a South-down ram, and you will get a fine fat lamb, such as the butchers covet, and will pay you a good price for when three or four months old ; or if you prefer to castrate your ram lambs, and keep them until two years old, and feed well, you will have wethers that will weigh from 150 to 200 pounds each, and at the present low price of mutton will bring from eight to ten

dollars each in our own little market of Petersburg. Their wool will amply pay for keeping until they will do this.

Now, I must say a few words in regard to Mr. Bailey's Cotswold ram "Prince" (I am satisfied that he is a good one); but Mr. Bailey says he is two years old, and sheared 18½ pounds wool last spring. He does not say how many years' growth it was, but probably it was all that he had made up to the time he was sheared; and if so, he would improve our native sheep; but my Cotswold ram, "Dick of Linden," would improve them more, for he has done better than "Prince." "Dick" is four years old; and when one year old sheared 13½ pounds, and had wool that measured 11 inches long. When two years old, he sheared 12½ pounds, making 26 pounds of wool in two years (not dirt and wool). When between two and three years old he got hurt, so that last year he did not shear as heavy as he should; but he is all right now, and bids fair to do the right thing next shearing. Last year I also sheared eight ewe lambs less than a year old that gave me 68 pounds of wool, or an average of 8½ pounds each; and I now have eight more that will be a year old in May that I am satisfied some of them will give me over 10 pounds each next shearing time; and all of these are a cross between Cotswold and native Southern sheep. I have some lambs that are a cross between a South-down ram and my Cotswold native ewes, which are very fine, of which I will report hereafter. Meanwhile let us wish Mr. Bailey much success in his laudable effort to improve the sheep in the South.

C. BURGESS.

DINWIDDIE COUNTY, VA.

CHAPTER VIII.

IMPROVING SOUTHERN SHEEP.

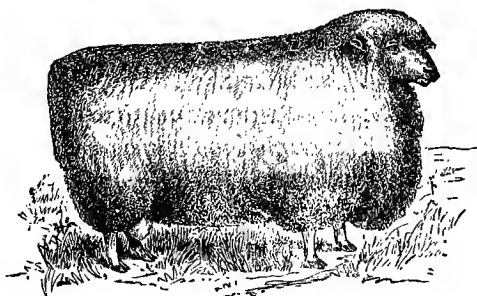
MR. C. BURGESS is a good farmer. He is lately from New-York State. He, like myself and hundreds of others, see the advantages which Virginia offers for an improved agriculture. Here is my reply to his remonstrance :—

I am truly glad that Mr. C. Burgess has got such fine sheep as he has ; and I am free to confess that when I said, “the Southern sheep-owners know that a Cotswold cross will do them no good,” I stated it a little too strong. I should have said that it was *by no means the best cross* for them. I know from the way Mr. Burgess writes, that he takes good care of his sheep, that he raises clover and tame grasses, that they are sheltered from cold and driving rain-storms, or else fed an extra ration of grain at such times to enable them to withstand the inclemencies.

Now, I will say that for the average Southern sheep-owner who raises little if any tame grass or clover, whose sheep have got to get their living on the commons, and which receive but very little care, which get no feed during the winter except a few corn-shucks or pea-vines when the weather is unusually severe, or when snow covers the ground, a Cotswold cross would be about the worst cross he could make. The progeny of a Cotswold buck and the ordinary sheep of the South would have longer legs and longer wool, and perhaps a little more of it. They would be tall, raw-boned walking skeletons ; and I very much doubt if many of them survived the first winter’s neglect which their dams have been subjected to for generations.

I do not say but what Mr. Burgess’s sheep are good ones, and

that his neighbors who follow his example and take good care of their sheep have profited by the use of rams obtained from him. My article was not written for such as he, but for the average Southern sheep-owner, whose sheep I wish to improve, whether he takes better care of them in the future than in the past, or not. When I have *improved* them, perhaps he will take pride in them, and care for and feed them better. Then he will be ready for a further improvement, *compatible* with the changed conditions in which his sheep find themselves.



TWO-CROSS COTSWOLD-MERINO RAM.
Weight 210½ lbs.; sheared 16 lbs.; two years old.

Mr. Burgess says that he wields the plough and hoe better than the pen. That may be, but I will say this: that, if he does, he is a mighty good ploughman. He says, "Theory is good, but practice is better." I agree with him; and he intimates that if I will come and see him he can show me some Cotswolds and Cotswold crosses that will rather astonish me. Perhaps so: of one thing, however, I am certain, — that I should like to visit him anyway.

Now, I have as yet only a theory as to the desirableness of crossing the Oxford-merino rams upon the common sheep of the South. I think it would be a very desirable cross. I am trying it as he tried his Cotswold cross. He and his neighbors have done well. I think my Oxford-merino cross will be better. Time will show.

I, as well as my esteemed brother farmer (by the way, I have held the plough many a day, as well as wielded the hoe), like

facts better than theory: therefore I will quit theorizing, and deal in facts, narrating a few that have caused me to have faith in the Oxford-merino cross for the purpose above stated.

First, as to my Cotswold ram "Prince." He sheared, when he was two years old, 18½ pounds of fine, long, lustrous wool, which was his second fleece; the weight of his fleece when he was one year old was 12½ pounds. (Sheared May 1, 1880, 17½ pounds: 48½ pounds in 3 years.) He now weighs 302 pounds in breeding condition, and has no better feed than a flock of 90 merinos with which he has run since they were all safely with lamb. So much for "Prince."

As much as Mr. Burgess likes practice or facts, he is evidently theorizing when he talks about merinos. He says "the merino has the same fault our native sheep have, and that is, they do not give milk enough for their offspring." I will give a few *facts* upon this point, and then we can see how his statement tallies with the facts.

I have a ewe (see No. 2, in table of Cotswold weights and fleeces, p. 169) three years old this spring, whose mother was a merino weighing less than 80 pounds, and whose sire was a pure Cotswold. This ewe weighed when two years old 160 pounds, and sheared for her second fleece 6½ pounds of fine washed wool about four inches long. This is the first cross.

I have also a two-cross ewe (see No. 673, p. 169) of the same age, which weighed when two years old 179 pounds, and sheared for her second fleece 15 pounds of long, lustrous wool. I measured her wool to-day, and it is 14½ inches long. I enclose a sample for Mr. Burgess's inspection. She is the granddaughter of a little merino ewe weighing less than 80 pounds.

I have also a three-cross ram lamb (see No. 509) which weighs 173 pounds; his wool is 13½ inches long. He weighed 14½ pounds when born; when two months and fourteen days old he weighed 91 pounds. He is the great-grandson of a little merino ewe weighing less than 80 pounds.

Now, let me ask how these weights could be obtained if the original merino ancestors gave but *little milk*? For what your correspondent from Dinwiddie says about stinting the lamb is true: they will never be the sheep they would have been had they been well nourished when young.

The fact is, there is no breed of sheep so useful to use on *merino ewes* as the pure Cotswold. But the native sheep of the South are the very opposite of a merino.

Now a few words as to Oxford-downs, concerning which Mr. Burgess says his knowledge is limited. I do not wish to be understood as intimating that my knowledge is by any means unlimited.

From the name of his Cotswold ram (and he is a good one), "Dick of Linden," I infer that he came from T. S. Cooper, of "Linden Grove," Coopersburg, Penn. (This is a theory.) And I will say that Mr. Cooper sold all his Cotswolds some time ago, and replaced them with Oxford-downs. Mr. Cooper says in regard to changing his breed of sheep as follows: "When in England in 1875 I could not decide which to buy, — 'Oxfords,' 'Shropshires,' or 'South-downs;' and upon asking Mr. John Thornton, the noted short-horn auctioneer, which to try, he advised me to buy a few of each, and keep them together in pasture for one year, giving them all the same attention, and by the end of the season I could tell which I liked best. I followed his advice; and not only did I give one, but two years' trial. As expected, the Oxfords were the favorites of every breeder."

About this time Mr. Cooper disposed of his Cotswolds; and whether "Dick of Linden" came from "Linden Grove," or not, the above proves that one of the most noted breeders in America was dissatisfied, and wanted something better, and thinks he has secured it.

I do not agree with him exactly. I think for breeding in their purity, or for crossing on merinos, the Cotswold has *no* superior.

I have pure Oxford-downs, the progeny of fourteen ewes bred by John Treadwell and A. J. Milton Druce, England, and a ram by the Duke of Oxfordshire, which were imported by T. S. Cooper, and sold to Henry C. Kelsey, Secretary of State of New Jersey, for \$1,800. They are all last May ewe lambs, excepting one yearling ram, "Grand Duke of Oxford," who is now at "Virginia Stock Farm."

Mr. Cooper's flock of Oxfords sheared, in the spring of 1876,

12½ pounds on an average. Robert C. Estil, of Lexington, Ky., proprietor of the Elmhurst flock of Cotswolds, one of the best flocks in the country, writes as follows: "My Oxford yearling ewes sheared me on an average 17½ pounds of good wool, bringing me the highest market prices. They are, without exception, the *finest milkers* I ever saw. They are extraordinarily prolific, having twins as a rule, and often triplets: they can raise three lambs as well other breeds can raise one."

I could give many more facts and statements of distinguished breeders, but think enough is shown to convince any one that my critic's theory as to the Oxfordshire-downs being poor milkers is hardly in accordance with the facts.

The Oxford-down ram, "Freeland," which I had the pleasure of seeing last January, weighed when imported 425 pounds; and thirteen ewes, imported in 1879, weighed on an average 250 pounds.

To return to the Cotswolds, "Lady Brutus," No. 30, a pure Cotswold ewe in "Winning flock," had a pair of twin ewe lambs on the 21st of February; weight when born 21 pounds; when three weeks old they weighed 48 pounds; when five weeks old 66 pounds; when eight weeks old, 92 pounds; when 12 weeks old, 110 pounds.

In conclusion, I will say, if Mr. Burgess will visit me I will show him some Cotswolds, also Oxford-downs, as well as merinos, that will be worth looking at.

And next fall I will show at the Richmond and Petersburg fairs some Oxford-merino lambs, with their merino dams, against his first-cross Cotswold lambs with their native mothers—and may the best win!

CHAPTER IX.

HOW I PROPOSE TO RESTORE THE FERTILITY OF AN OLD COTTON-PLANTATION.

IN May, 1879, I purchased an old cotton-plantation in Virginia, and have been engaged in stocking it with short-horn and Jersey cattle, Oxfordshire-down and merino sheep, Berkshire swine, and imported French horses.

The first thing to be always borne in mind is the permanent improvement of the land.

My experience with commercial fertilizers is not such as to encourage me to continue to use them on a large scale. Home-made manures will be manufactured and saved from every source. The stock will be yarded nights where plenty of leaves and wood-mould will be kept to absorb all liquid droppings, and to prevent the loss of valuable elements by fermentation or evaporation. In addition to this we must depend chiefly upon turning under green crops, a proper rotation of crops, and the cultivation of *clover*. No other grass is worthy to be named beside it.

In relating what we are doing and propose to do at "Virginia Stock Farm," I will first say, that, if our plans commend themselves to the judgment of Southern readers, they can adopt them and do likewise. If not, they can wait and see the results; and, if they are what *we* expect, they can follow our example.

The plantation which I have christened "Virginia Stock Farm" is situated in the southern part of Sussex County, about six miles from Waverly, a station on the Norfolk and

Petersburg division of the Ohio, Atlantic and Mississippi Railroad.

It comprises about 2,500 acres, about 400 of which have been in cultivation by tenants for several years, about 1,000 acres in old fields, more or less grown up to pines and covered with a sod of broom serge (*andropogon*), balance in original forest.

Winter being the best time to bring stock from the North to a warmer climate like Virginia, I procured 54 heifers and two bulls selected in person from the herds of J. D. Gillett of "Elkhart Park," Logan Co., Ill.

A short description of his herds will doubtless interest the readers of this book.

"Elkhart Park" comprises about 10,000 acres of rich prairie-land. Mr. Gillett has upon it over 3,000 head of short-horn cattle. He commenced raising cattle over forty years ago, procuring the best short-horn stock he could. Since then, whenever he has found a bull *better* than his own, he has bought him, and used him upon his herds. His aim has been to produce short-legged, broad, heavy-quartered, blocky animals, that were hardy and would mature early. He has succeeded in producing an almost perfect beef animal, vastly superior to the pampered, delicate, but highly pedigreed short-horns of fashionable breeding. His calves, yearlings, two and three year-olds, are uniform in size and build, much more so than any herd of pedigreed short-horns that can be found in America.

By the English rule, all of his stock would be eligible for record, but for the fact that he has paid no attention to recording, devoting all his time and thought to producing, not individual animals of high merit, but a *race* of beef animals superior to all others. A glance at the premium list of the Chicago fat-stock shows for 1878 and 1879, when he competed with thoroughbred stock of all breeds, as well as their grades, winning over \$2,500 in prizes in the two years, is sufficient to convince any impartial observer.

In fact, it was all one way, so much so that last year he made a public announcement that he would hereafter make but one

entry in a class, so that other breeders might have some chance to win the second prizes at least.

He exhibited two car-loads of four-year-olds, two car-loads of three-year-olds, two car-loads of two-year-olds, and received first and second prizes upon each, and one car-load of yearlings upon which he received first prize. Year before last he took first prize for best three-year-olds, first and second prizes for two-year-olds; first and second prizes were also won upon steers one year old and under two.

He also took first prize in sweepstakes, both pure and grade (all breeds), competing for the best steer, three years old. Sweepstakes also for best two-year-old.

The chief interest was in the contest for the grand sweepstakes of \$200, cash, and "Stock-Journal Challenge Cup," valued at \$125, open to all breeds and ages for the best beast in the show.

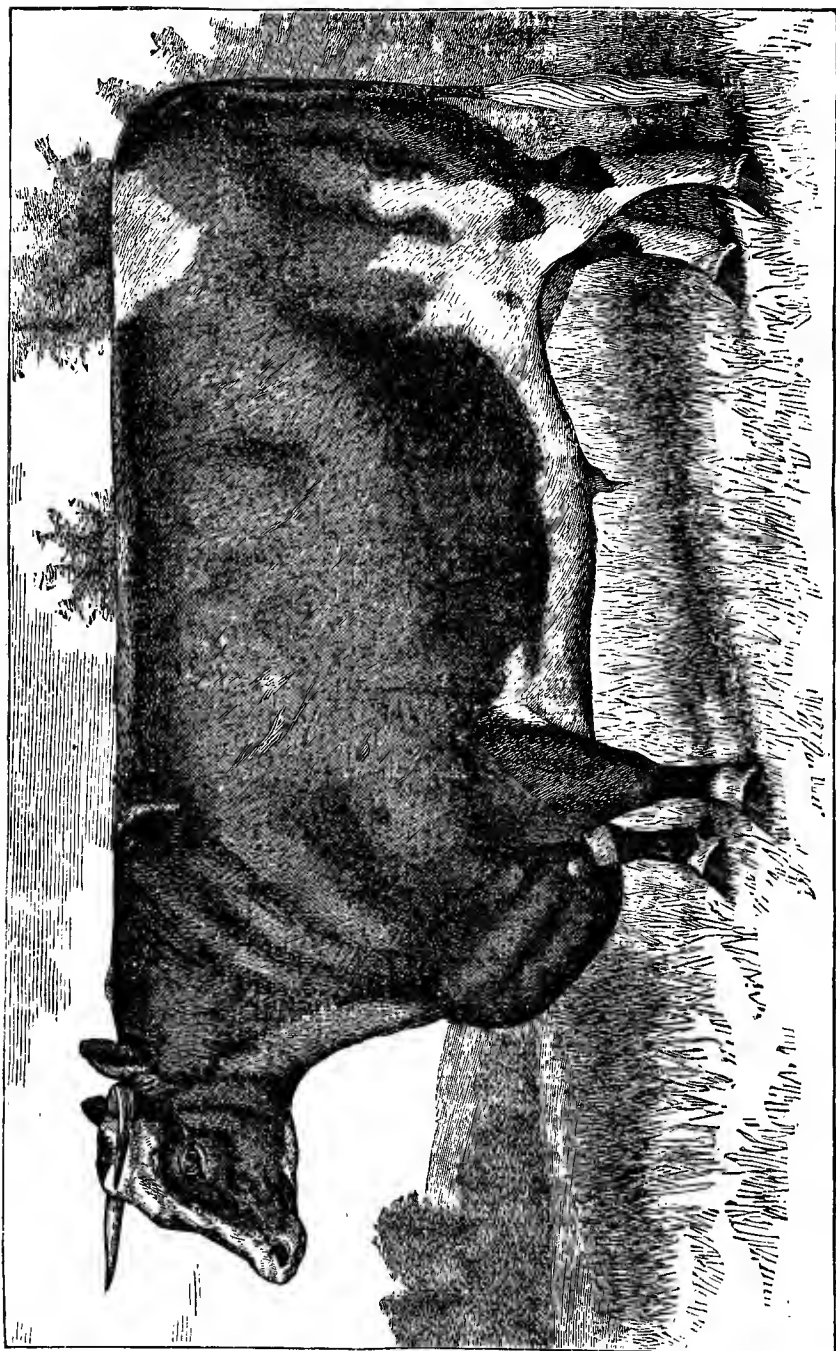
Twenty-one animals of all breeds and ages were entered, embracing the choicest animals in the show. The unanimous award was that J. D. Gillett's short-horn steer was the best; this being the third prize this steer received at the show.

"This award appeared to give universal satisfaction; for so perfect was the conformation, and so fine the condition, of this steer, that he was by common consent voted the champion from the opening of the exhibition." (*National Live-Stock Journal*.) See cut, p. 188.

Nor were these all the honors which Mr. Gillett's short-horns received. The grand prize of \$300, as well as the second prize for best car-load of not less than ten head, was awarded the Gillett short-horns. Forty pure and grade short-horns were entered for this prize.

In no case when the grades (so called) were allowed to compete, did a pedigreed animal bear off the prize.

I had the pleasure of visiting Mr. J. D. Gillett at his home, Elkhart Park, last November. A few days before my arrival he had sold 292 head of three-year-olds, whose average weight was 1,850 pounds, at \$5.65 per cwt., weighed upon his scales at home. He had a lot of 90 steers, all three-year-olds but eight, which were two-year-olds, in a lot which I ex-



GILLET'S CHAMPION SHORT-HORN STEER.

amined critically, for I had come 1,500 miles to buy breeding stock for "Virginia Stock Farm." All these animals possessed the same characteristics. Their backs were straight and broad from shoulder to loin, with flesh deep and even as a cushion. The ribs were well back, long and well covered, chests deep and wide, shoulders broad and well rounded, short neat necks, heads small, with mild, contented expressions.

Concerning this bunch of steers, Mr. Gillett on the 9th of December, 1879, wrote me as follows: "The cattle you saw, I have sold for \$5.85 per hundredweight. Their weight in Chicago was, first lot, 23 head, 1,985 pounds; second lot of 24 head, 1,988 pounds; third lot of 24 head, 2,036 pounds. This will make the lot of 71 head average a trifle over 2,000 pounds. I kept out 19 head of the *best ones*, for which I have refused \$6 per hundredweight. They are a splendid, extra lot, and I want \$7 per hundredweight for them."

We then rode to another pasture, and examined his two-year-old and yearling steers. They had never eaten any grain, nor been under a shelter. The next day we inspected the cows and bulls, and last the yearling heifers and heifer calves. Out of about 800 animals I selected 20 of the choicest yearlings, and 34 of the best heifer calves, and two yearling bulls.

They were weighed after they had been on the route two days. The yearlings weighed 850 pounds each, and the calves 500 pounds each.

This lot of short-horns are at "Virginia Stock Farm." I say they are the best lot of short-horns in America! that J. D. Gillett has built up a breed, or family, of short-horn cattle, by paying no attention to any thing but merit, that for beef, for hardiness, for power to reproduce the same characteristics in their progeny, exceeds any breed of cattle in existence.

As to pedigree, all I want to know is that an animal is one of J. D. Gillett's good ones. He never saves any but good ones, either male or female, for breeding purposes. All his cows are proved breeders. If one proves a poor breeder, she is fed for beef. By thus for more than forty years weeding out all animals of inferior or mediocre qualities, he has achieved this result.

The reason why his stock is better than pedigreed short-

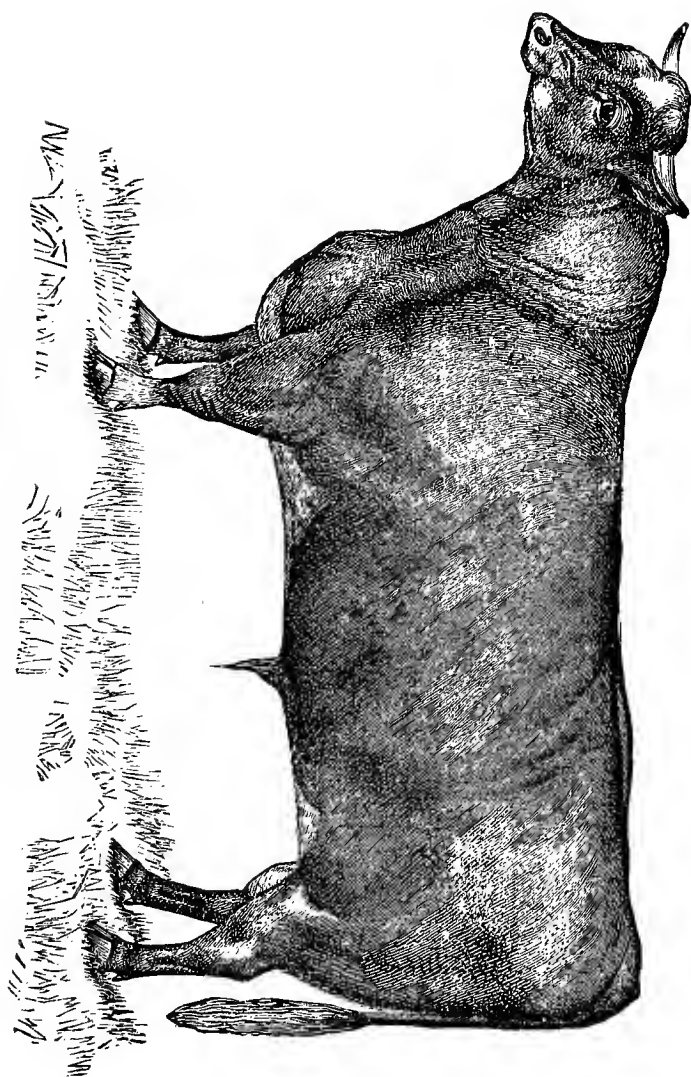
horns is, that every pedigreed calf is raised and kept for breeding; his pedigree sells him for more than he is worth at the shambles, the purchaser trusting that he will transmit the good qualities of his ancestors instead of his own inferior qualities. If pedigreed stock had been as mercilessly weeded out as Mr. Gillett has weeded his herd, they would not have to take back seats whenever they have to compete with his grades.

In all the attributes which render pedigreed short-horns desirable, J. D. Gillett's stock are immeasurably their superiors; and I consider them to be a distinct and superior breed, and, to distinguish them from the ordinary pampered and degenerated short-horns, christen them "Gillett's short-horns." We shall have bull calves of this famous breed for sale at "Virginia Stock Farm" this fall. They are the kind to use on the native stock of the South. Purchasers will run no risk of acclimation: these calves are born in Virginia, and can be taken with safety to any part of the South in the fall and winter. We have also a fine lot of young thoroughbred Jersey or Alderney bulls descended from such noted cows as Motley's "Flora," No. 923, A. J. H. B. (record, 511 pounds of butter in one year), "Europa," No. 74, A. J. H. B. (record, 19½ pounds of butter in seven days upon pasture and two quarts corn-meal daily). We shall keep constantly on hand choice breeding stock from the best strains.

For beef no bull would be as potent as one of the Gillett short-horns to use upon native cows. For milk-like cream and gilt-edged butter, use the Jersey bull of well-known butter-yielding strains.

We also have pedigreed short-horns of the purest blood. "Duke of Summerfield" was bred by the Massachusetts Agricultural College; was dropped Nov. 7, 1878. Sired by "Baron of Grass Hill," No. 18,975, American Herd Book. Dam, "Yucatella," No. 914, American Herd Book; granddam, "Yarico 57th;" great-grand-dam, "Yarico 11th," by "Kirkleavington." There is no better-bred bull in the United States. He was bought, when a calf, by John M. Bailey of "Winning Farm," Billerica, Mass., and "Virginia Stock Farm," Sussex County, Va., and raised at "Winning Farm." Was shipped to Virginia in the fall of 1879. (See opposite page.)

SHORT-HORN BULL, "DUKE OF SUMMERFIELD."



It may be asked what all this has to do with restoring the fertility of an old cotton plantation. I reply, it has every thing to do with it. Keep plenty of good stock-cattle, horses, hogs, and sheep,—especially the last two; feed them in winter, and in summer, when severe droughts prevail, upon Ensilage; yard them nights; save all the manure; and the old plantation will grow fertile, and the long-cropped soil blossom as the rose.

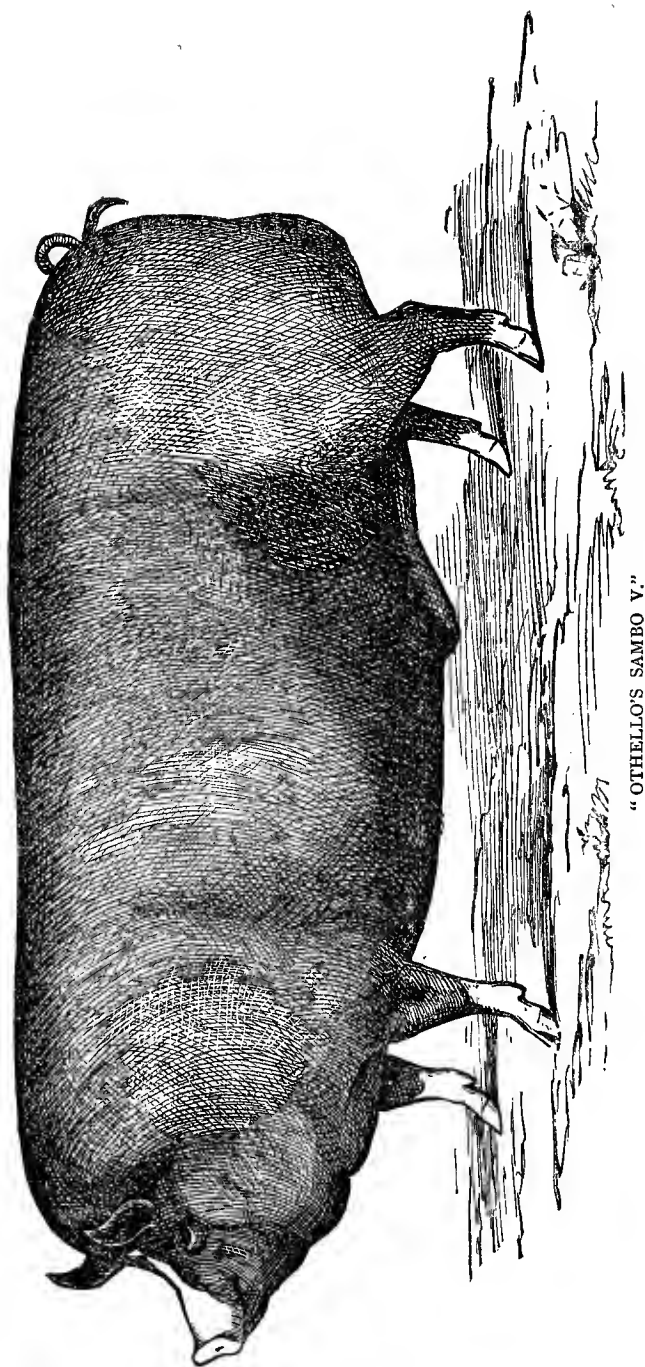
BERKSHIRE SWINE.

CHAPTER I.

THE "WINNING HERD."

"OTHELLO'S Sambo V." was placed at the head of the "Winning Farm" Berkshire breed, in March, 1879, and in his breeding qualities bids fair to rival his famous grandsire "Othello." He has all the characteristics of the Berkshires in a marked degree,—grand style, fine head and ears, long, broad and level back, very heavy deep hams, and is in all respects a model. His grandam's sister, Mr. Cooper sold for \$1,000. I have the greatest difficulty to keep him from getting *too fat*. In fact, they are all alike in this respect. I am satisfied from careful experiments that it costs no more to make three pounds of pork with Berkshires than it does to make two pounds with any other breed I am acquainted with. The ham of the well-bred Berkshire is at least fifteen per cent heavier in proportion to his weight than other breeds, with a much larger proportion of lean meat. The meat is fine-grained and of excellent flavor. There is, in some sections of New England, a prejudice against their color. That is an objection which is *not* skin deep, for after they are dressed they are whiter than the white breeds.

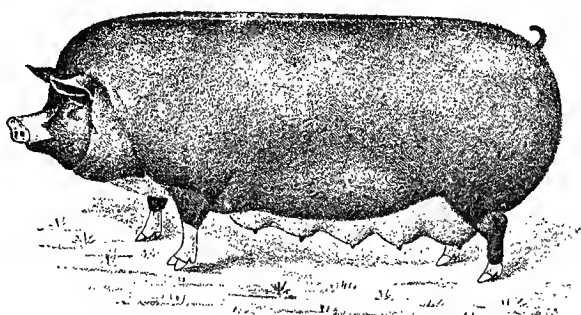
He was imported May 14, 1877, farrowed March 8, 1877. His pedigree runs directly back through six generations of pure Sallies, to the famous "Sallie I." On the male line we find such



"OTHELLO'S SAMBO V."

illustrious ancestors as "Othello's Sambo," "Othello," — the sire of all the "Sallie" and "Sambo" families, — "Dewe Boar," "Second Duke of Gloucester," "King Tomb's Boar," and the "First Duke of Gloucester."

This magnificent boar was placed at the head of the "Sallie" family in the "Linden Grove" herd of T. S. Cooper, a place he occupied with honor to the herd as well as himself, until he was drafted to occupy the highest place in the "Winning-Farm" herd.



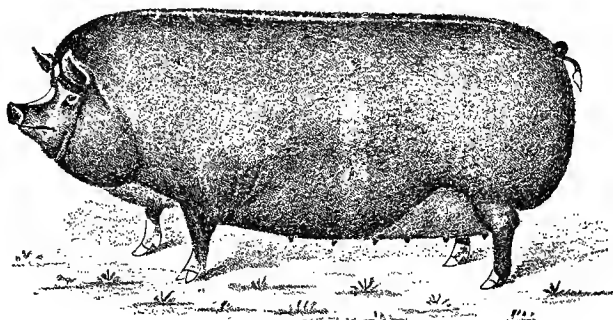
"SALLIE XX.'S SISTER."

The imported sows which have contributed to the "Winning Farm" herd consist of "Sallie XX.'s" sister, the largest "Sallie" sow in America: at the same time she is of remarkably fine form and carriage. She will weigh, in breeding condition, about 550 pounds; if fat, would easily weigh between 800 and 900 pounds. She raised a fine litter this season, and since they were weaned, July 30, until the cold weather came on, had nothing but grass. She was bred by Russell Swanwick, England, and imported May 25, 1876.

Next comes "Presbury," of whom Mr. Cooper wrote me, when she came to "Winning Farm" last March, as follows: "I have sold over \$1,200 worth of pigs from 'Presbury,' since I imported her, May 14, 1877."

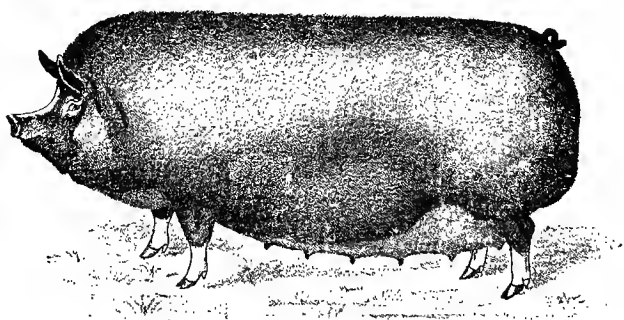
"Sallie VIII.'s" daughter was got by a Stumpy boar, who won the first prize at Berks and Hants show, England. "Sallie VIII.'s" daughter was one of three in a prize pen at the Centen-

nial. Mr. Cooper states in his catalogue, "'Sallie VIII.' never had a better pig than this magnificent daughter, and 'Lady Liverpool' has reason to be proud of her granddaughter." "Lady Liverpool" has the finest pedigree and record of any "Sallie" sow in the world. She took the first prize at Gailford, 1871; the



"PRESBURY."

reserve number at the Royal at Wolverhampton, 1871; first prize and silver cup at Liverpool, 1871. Her sire, the "Heber Boar," took the first prize at Gloucester, 1868. She won more prizes, and bred more prize-winners, than any sow in England. She was imported in 1876 by T. S. Cooper.



"STUMPY VIII.'S DAUGHTER."

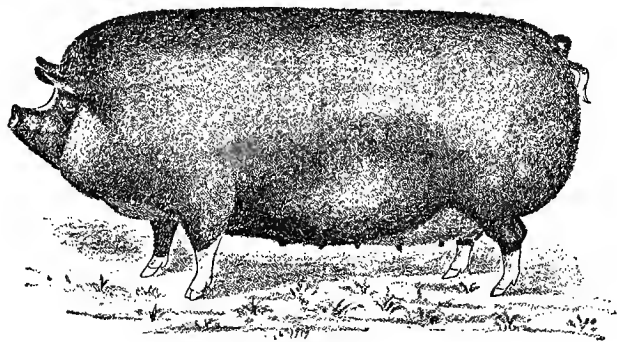
"Stumpy VIII." is a remarkable sow, — great in size, perfect in form, with the finest Berkshire head I ever saw. Her sister

"Stumpy X.," Russell Swanwick sold for £90 (\$450) in gold. Her progeny are remarkably fine specimens, and occupy a conspicuous place in the "Winning-Farm" herd.

"Stumpy VIII.'s Daughter" is pronounced by all who have seen her, as the finest Berkshire sow. As one breeder exclaimed upon inspecting her, "I don't know where to take off a quarter of an inch, or where to add an ounce."

She is perfectly marked, has an exceedingly short dished face, very heavy hams, in short, cannot be excelled at either end, and her middle is as good.

She is in farrow by "Belladonna's Smithereen," a promising young boar out of "Linden Belladonna" by "Stumpy's Smithereen."

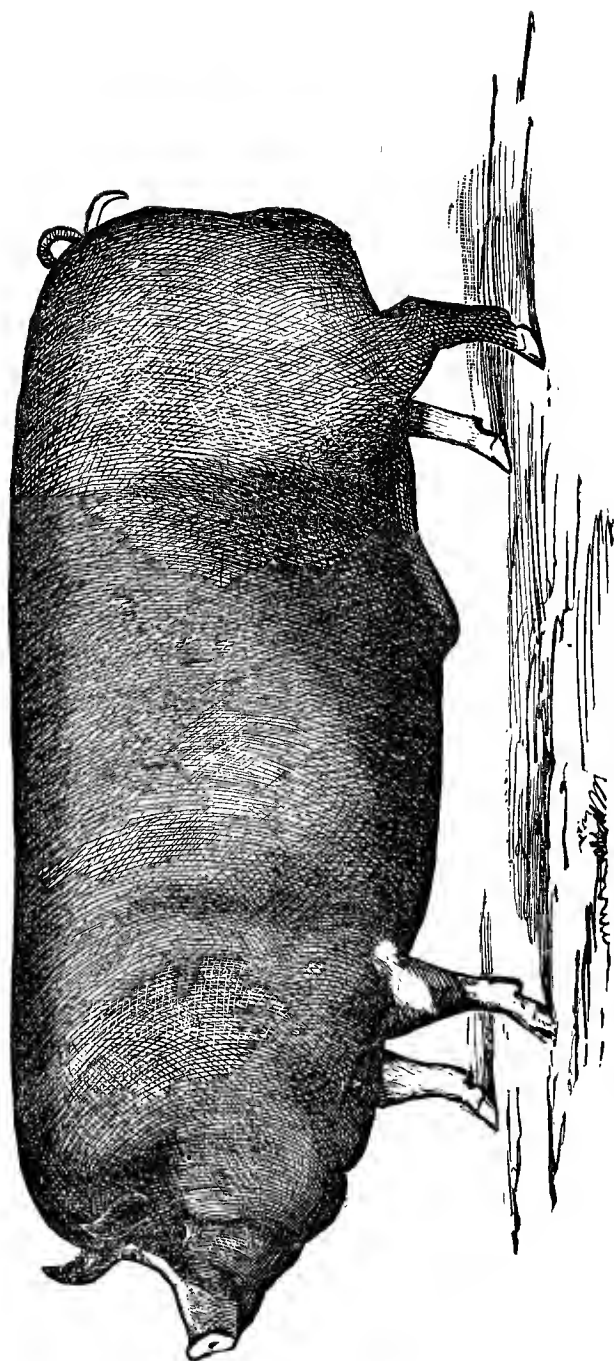


"LADY ALICE SWINEVILLE."

"Lady Alice Swineville" is one of my most fashionably-marked sows. She was bred by Mr. Heber Humfrey, England. She has nine little "Sambos" following her, which, for true Berkshire style, cannot be equalled.

This young sow was amongst the best of the 1877 importations, and for real merit, handsome style, and fashionable markings, cannot be beaten. As a breeder she is without an equal. "Virginia Sambo" is a son of "Lady Alice" by Othello's "Sambo V."

"Virginia Sambo" was selected to take the place at the head of the "Virginia Stock Farm:" he is a perfect reproduction of his sire, "Othello's Sambo V."



"VIRGINIA SAMBO."

"Frozen Ear," a full brother to "Virginia Sambo," and equally well formed, is also at "Virginia Stock Farm."

The sows at "Virginia Stock Farm" consist of

"College Lass" No. 1 has a litter by Othello's "Sambo V." Nos. 2, 3, and 4, are due in May by "Winning Chief," another of "Lady Alice's" sons, who is sure to make his mark.

"College Lass" No. 1 was bred by the Massachusetts Agricultural College, farrowed Sept. 5, 1878, sired by "Sambo, jun.," No. 2,247 American Berkshire Record. Dam, "Pride of Autumn," imported by Sawyer, of Easthampton, Mass. "College Lass," Nos. 2, 3, and 4, by "Sambo, jun.," out of "Electra." "Pride of Autumn" dressed 425 pounds, right from pasture, without being fed any grain.

"Winning Sambo" is another brother to "Virginia Sambo," for whose remarkable qualities we must give Othello's "Sambo V." and "Lady Alice" credit.

"Lady Alice's daughter," "Winning Alice," "Winning Ada," "Winning Agnes," "Winning Achsa," and "Winning Aurora," are six daughters of "Lady Alice Swineville" by "Othello's Sambo V.," farrowed Nov. 2, 1879. They form a pen that I delight to look at: they are perfect miniatures of their sire and dam; they combine all the good qualities to be found in the Berkshire. They will be bred to the "Duke of Presbury," son of imported "Presbury" mentioned above, whose breeding qualities are second to no sow in the world. "Duke of Presbury" is sired by "Earl of St. Bridge."

The "Earl of St. Bridge" won first prize at the Royal, held at Liverpool, Eng., July, 1877, besides three other first prizes at different shows in the same county. He also won general sweepstakes for the *best boar and two sows* ("Belladonna's" niece, and "Stumpy IX.") *of any age or breed*, at St. Louis, 1877. He inherits in an unusual degree several marked characteristics of his progenitrix "Lady Liverpool."

"Earl of St. Bridge" is also the sire of "Dynasty," a very stylish boar out of "Sweet Diana," a remarkably fine sow of the "Sweet Seventeen" strain. There are none better.

"Sweet Diana" was imported by T. S. Cooper, bred by Heber Humfrey, England.

Another son of the "Earl of St. Bridge" is a remarkably well-built young boar out of "Sweet Janet," a full sister of "Sweet Diana." He has but one fault,—his head is a little coarse; and on that account I will sell him very low, \$25 boxed and delivered on board cars. He was farrowed April 7. Dam, "Sweet Janet," got by son of "Sweet Seventeen's" sister, by "Sir Dorchester Cardiff;" 2d dam, "Sweet Lucretia," by "Smithereen;" 3d dam, "Sweet Desdemona," by "Maple Grove;" 4th dam, "Sweet Seventeen's" sister by "Lagrange." His unexceptionable pedigree would make him a valuable addition to any herd requiring an infusion of fresh blood from a different strain.



"WINNING BELLADONNA."

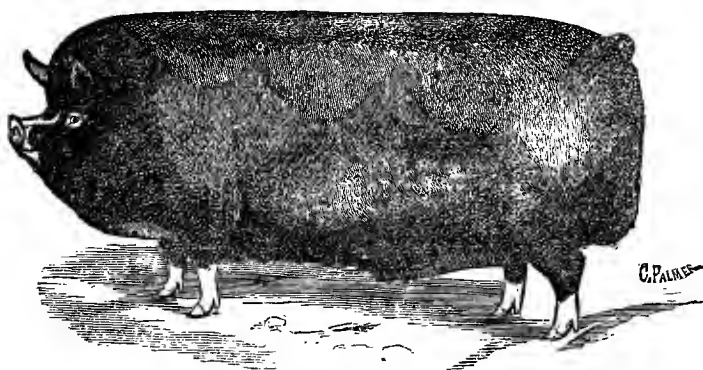
"Winning Belladonna," imported Aug. 22, 1877, is one of the finest Berkshires in America. She has an unexampled pedigree. She was bred by Mr. Heber Humfrey. Her dam, "Belladonna's" niece, and her great-aunt "Belladonna," have taken more prizes than any two sows in the United States and Canada. "Belladonna's" niece, as follows: First prize and sweepstakes at Paris, Ky., 1877; sweepstakes at Lexington, Ky., as best sow of all breeds, 1877; at Indianapolis, Ind., first prize; also, first as best sow and pigs, 1877. To crown all, at St. Louis she secured the sweepstakes as the best Berkshire on the ground; also sweepstakes as the best sow of *any breed or age*, and the general sweepstakes (with "Earl of St. Bridge" and "Stumpy IX.") as best boar and two sows of *any age or breed*.

"Belladonna," "Winning Belladonna's" great-aunt, won the first prize in her class at the Centennial, and was there awarded

the grand sweepstakes prize of \$50 and medal, as the *best* sow of *any age or breed*. She weighed 770 pounds. Mr. T. S. Cooper was offered \$1,600 for her while on exhibition, but refused the tempting offer, believing her to be worth more to him as a breeder. These sweepstake prizes for the *best of any age or breed* ought to settle the question of the Berkshire's superiority.

"Winning Smithereen" and "Belladonna's Smithereen" are two very fine young boars, partaking in a marked degree of the excellent characteristics of the justly celebrated "Belladonna" family.

They have very short dished faces, good bodies, hams, and shoulders, and are covered with a plentiful coat of fine jet-black



"SMITHEREEN."

hair. They were so fine that I bred "Stumpy VIII.'s Daughter" to "Belladonna's Smithereen," and I could not pay him a greater compliment. I do not know which is the best. One of them will go in the fall to "Virginia Stock Farm;" the other will remain here to represent the "Belladonna-Smithereen" strain.

There are three more sows bred by Heber Humfrey of the "Sweet Seventeen" family, which have added another choice strain to the "Winning-Farm" Berkshire herd.

To sum up their merits, all must admit their extreme hardiness. They are more active than other improved breeds, which enables them to graze and do well when others would perish. They are wonderfully prolific, often having 12 to 16 fine pigs at

a litter ; good mothers, and docile to handle at all times. They are especially adapted to cross upon the common swine of the country, their strong constitutional origin marking the grade pigs so strongly that they would deceive a connoisseur unless he knew their breeding.

Berkshire pork, I am credibly informed, brings a penny a pound more in the markets of England than other breeds.

The boars who have sired the "Winning-Farm" herd comprise "Sambo XVI.," "Othello's Sambo V.," "Earl of St. Bridge," and "Stumpy's Smithereen;" thus giving three entirely different strains, so that all in-breeding is avoided, which is absolutely necessary if the constitutional vigor of a herd is to be maintained.

Young pigs of the above strains for sale at reasonable prices. No charge for delivery on board of the cars or to express companies. When possible I will get a through rate, and save purchasers all unnecessary expense. All orders received at "Winning Farm" from the South delivered at Norfolk to railroads centring there, free of charge. Orders received at "Virginia Stock Farm" delivered to the Atlantic, Mississippi, and Ohio Railroad, *f.o.b.*

M. W. DUNHAM'S OAKLAND STUD — OF — **Percheron-Norman Horses.**

The Largest and Most Complete Establishment of the kind in the World.

**More than Two Hundred Stallions and Mares
Imported from the best Stud-Stables
in France.**

Winners of the First Prizes in Europe and America.

First Prizes and Gold Medals at Universal Exposition at Paris, over all.

First Prizes and Grand Medals at the Centennial Exhibition, 1876.

Nothing has been spared in the development of an establishment that, in its systematic appointments, its practical and common-sense management, its accumulation of the choicest animals of the breed, combining the highest elements of value in draught-horses,—*size, symmetry, style, action* and **QUALITY**,—has no equal in the *world*.

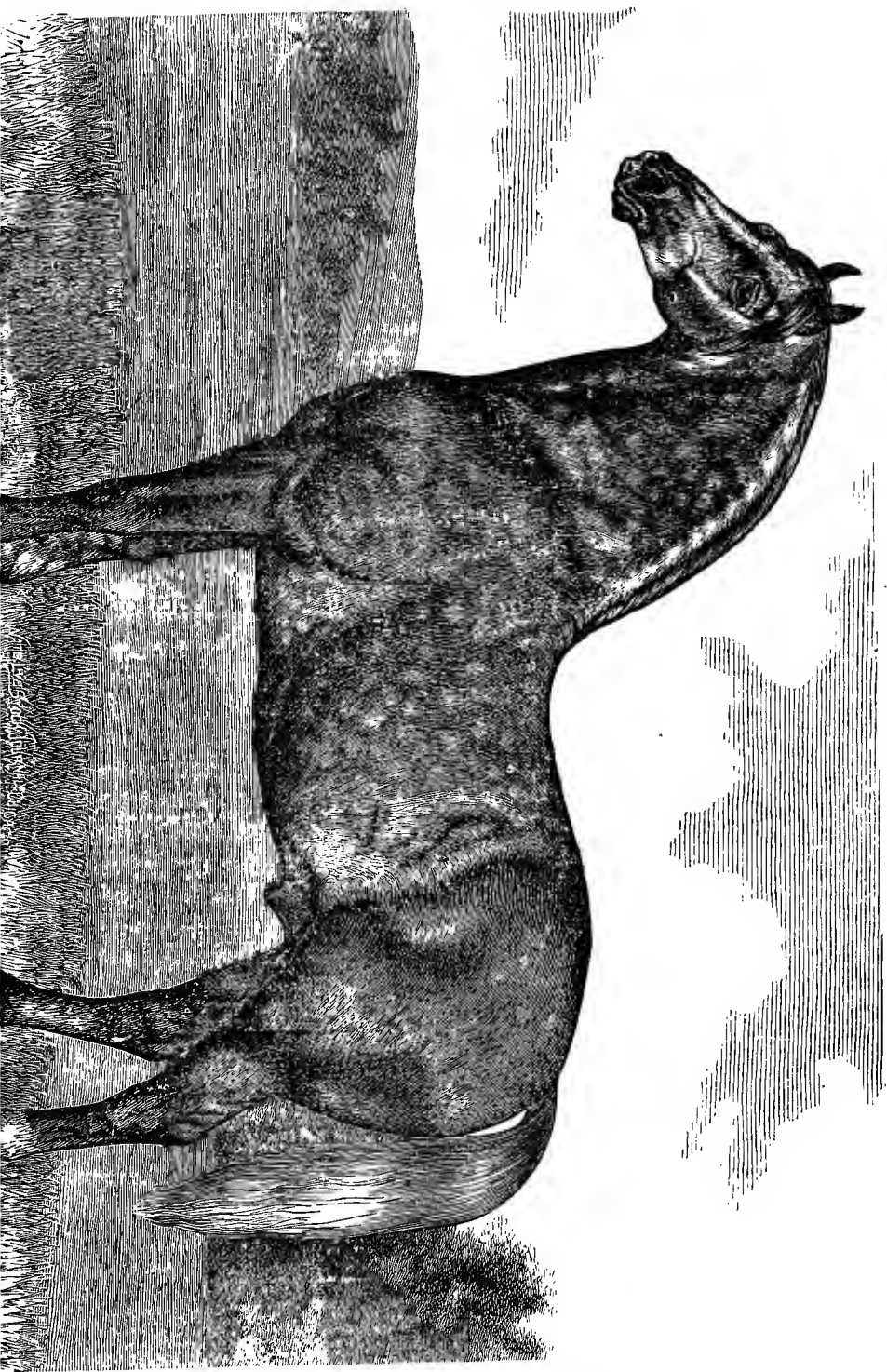
The public appreciation of its merits is indicated by the great demand for stock from every part of the country. During the past twelve months the Provinces of New Brunswick, Canada, and the States of New York, Pennsylvania, Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Nebraska, Kansas, Texas, Louisiana, Colorado, Nevada, California, and Oregon, and Utah, Washington, and Idaho Territories, have drawn supplies from its stables. By the aid of large annual importations, selected personally from the best breeding districts of France, I am determined to sustain its prestige, and be prepared at all times to afford purchasers an opportunity of selection from animals of the most undoubted quality, and at terms and prices that cannot but be satisfactory.

One-hundred-page CATALOGUE now ready. The finest thing of the kind ever issued. Twenty-five pictures of stallions and mares sent **FREE** on application.

M. W. DUNHAM,
WAYNE, DU PAGE COUNTY, ILL.

A fresh importation of these horses arrived April 15.

N. B.—Every pure-bred animal recorded in **PERCHERON-NORMAN STUD-BOOK**.



BRADLEY'S PHOSPHATE,

THE STANDARD FERTILIZER

FOR ALL CROPS.

This phosphate was introduced twenty years ago, and from the first year of its use the demand has steadily increased until its sales have reached enormous proportions. Its unparalleled success is due to the fact that its *uniformly high standard* has always been maintained, every shipment being analyzed by competent chemists before leaving the factories.

It is a high-grade bone phosphate, and contains all the elements of plant food in the most approved proportions, to meet the requirements of the various crops, based on the experience and demonstrations of the oldest and largest manufacturers, and on the experiments of the best agricultural chemists in the world.

It is finely ground and dry, and in its mechanical condition, as well as in its chemical composition, defies competition.

It has been used from Nova Scotia to Louisiana, and from Maine to Illinois, in growing *all* the various crops in the different sections, and has always given the most satisfactory results.

This fertilizer is especially recommended for growing fodder-corn and other green crops, for the new curing process of *Ensilage*, and for raising Hungarian grass, millet, and all root crops.

It is put up in barrels or bags to suit the purchaser.

Pamphlets, giving testimonials, directions for use &c., sent free on application.

Address all communications to

BRADLEY FERTILIZER CO.,

MANUFACTURERS OF STANDARD FERTILIZERS AND IMPORTERS OF AGRICULTURAL
CHEMICALS.

OFFICE AND SALESROOMS, - - 27 KILBY STREET, BOSTON, MASS.

SEE TESTIMONIALS ON BRADLEY'S PHOSPHATE ON THE NEXT PAGE.

TESTIMONIAL LETTERS

ON THE USE OF

BRADLEY'S STANDARD PHOSPHATE.

FROM THE PRESIDENT OF THE HUBBARDSTON FARMERS' CLUB.

HUBBARDSTON, MASS., Nov. 25, 1879.

BRADLEY FERTILIZER CO.:

Gents.—I have used commercial fertilizers for the last two years quite extensively. In 1878 I contrasted Bradley's Phosphate with another noted special fertilizer for corn. I used them in the same field, side by side with like culture, and Bradley's Phosphate gave me the *most fodder*, the *most corn*, and an *earlier crop*. During the same year I raised excellent beans and potatoes on Bradley's Phosphate alone: this year I planted nothing without using your fertilizer. As an experiment I took one acre of my *poorest* land, which two years ago was more or less covered with brush, and on which in 1878 I cut a crop of rye. This land had never been fertilized with barn-yard manure. I planted it with potatoes, using nearly four hundred pounds of your fertilizer. The field was planted late, but yielded a hundred and fifty bushels of very nice and smooth potatoes. The crop was hoed only once. From two years' experience I am convinced that paying crops of potatoes can be raised on your fertilizer alone. I am further convinced that it will hurry forward all garden crops as well as field crops, and will greatly increase their amount.

Yours truly,

HENRY A. FARWELL.

FROM ONE OF THE LEADING FARMERS OF PENOBSCOT COUNTY.

CORINNA, ME., Aug. 2, 1879

BRADLEY FERTILIZER CO.:

Gents.—I have used your Phosphate for the past twelve years, and always with satisfactory results. I have given many other commercial fertilizers a trial, but find that Bradley's goes ahead of them all. Last spring I used your Phosphate on all my corn, with the exception of ten rows where I used a special formula manure, using it at the same rate that I did your Fertilizer, and I find that there is double the corn on the same area of land where I used the Phosphate; and my neighbors agree with me in this statement.

Truly yours,

J. L. JONES.

FROM THE CHAMPION CORN GROWER OF THE STATE OF MAINE.

SKOWHEGAN, ME., Oct. 18, 1879.

BRADLEY FERTILIZER CO.:

Gents.—Some five years ago I commenced using Bradley's Phosphate. Since that time I have tested all the different commercial fertilizers brought into this county. Last spring I planted sugar-beets with Bradley's Phosphate, and tried alongside of it another brand of Super-phosphate, and also a special sugar-beet fertilizer. I find that *Bradley's Phosphate leads on sugar-beets as well as corn and grain*, and I am more convinced than ever that it is the *cheapest, best, and most reliable* of any commercial fertilizer ever brought into the State of Maine.

Respectfully,

R. B. SAVAGE.

FROM THE PRESIDENT OF THE CHESHIRE COUNTY AGRICULTURAL SOCIETY.

KEENE, N.H., Nov. 18, 1879.

BRADLEY FERTILIZER CO.:

Gents.—I have been experimenting a little with fertilizers during the past season. I planted corn with three different kinds of commercial fertilizers, Bradley's Phosphate, an animal fertilizer which was offered for sale about here, and a somewhat noted special manure for corn. I made the trial just as fairly as possible, using them side by side on the same land, and giving the same chance to all. I could not see any difference between the animal fertilizer and special manure neither at harvest time nor during the season; but where I used Bradley's Phosphate the corn was about *ten days ahead and all of one-third heavier than either of the others*. I have used Bradley's Phosphate for fifteen years, and it always gives me good returns. I have tried almost every other kind of fertilizer sold about here, but I prefer Bradley's Phosphate. I raise my corn crop with it every year, and I have taken first premiums for several years at the Cheshire County Fair for the best corn. Sometimes I leave five or six rows through my field without putting in any Phosphate, and it always looks as if there was a deep ditch running through the piece. The trouble about here with the corn crop is, we can't get it out of the way of early frosts. I find no trouble when I use Bradley's Phosphate.

Truly yours,

CHARLES ABBOTT.

INCREASES WHEAT CROP SIXTEEN BUSHELS PER ACRE, AND DOUBLES CLOVER CROP NEXT YEAR.

PENN VAN, N.Y., June 16, 1879.

BRADLEY FERTILIZER CO.:

Gents.—I used four hundred pounds of your Super-phosphate in the fall of 1875 upon two acres of a six-acre field. The yield of wheat was sixteen bushels per acre more than on the portion where no Phosphate was applied. The growth of clover has also been much larger. Have used it on nearly all the wheat I have sown since the fall of 1875, and it has increased the yield from ten to twenty bushels per acre. This year the growth of clover is more than double on that portion of the field where Phosphate was used.

Yours truly,

SAMUEL PERRY.

GRASS.

ASTONISHING RESULTS FROM THE USE OF BRADLEY'S FERTILIZER ON GRASS.

[FROM HON. JAMES S. GRINNELL.]

GREENFIELD, MASS.

WM. L. BRADLEY, ESQ., BOSTON, MASS.

Dear Sir,—Pursuant to my promise, I will give you an account of my trial of your "Grass Fertilizer" on a lot then belonging to my late father. It was a low-lying tract supposed to contain ten acres, but proving to be but eight and one-half acres, and inclined to be wet, smooth, and level old sod, and full of all manner of foul stuff, from which we did not cut over five hundred pounds to the acre, not having been ploughed or manured for twenty years. In August, 1877, I put in two drains of stone across the piece, and ploughed it with a Michigan and an Ellis plow, from seven to nine inches deep; it was then sowed with your "Grass Fertilizer," at the rate of about four hundred pounds to the acre, and no other manure used; it was then barrowed, then sowed with herdsgrass and redtop, eight quarts of each to the acre, and rolled. It passed the winter well, and gave great promise through the spring, which did not fail me in the cutting. In April I sowed five pounds of clover to the acre. The grass was cut and hayed between July 1 and 6, and yielded a little over two tons to the acre of as good hay as was ever put into a barn. The grass came up so thickly and evenly that it was very fine and perfectly clean. I purpose seeding five acres this fall, the remaining portion of the old meadow, and shall want enough of the same compound for that amount of land. Very truly yours,

JAMES S. GRINNELL.

OATS RAISED WITH NO OTHER MANURE BUT BRADLEY'S PHOSPHATE.

SOUTH PEACHAM, VT., Nov. 23.

BRADLEY FERTILIZER CO.:

Gents,—I have raised, the past season, four hundred and fifty bushels of oats on nine acres of land. I used about two hundred pounds of Bradley's Phosphate to the acre, with no other fertilizer.

HARRIS LYND.

BIG YIELD OF POTATOES WITH NO OTHER MANURE BUT BRADLEY'S PHOSPHATE.

[FROM THE HAVERHILL DAILY BULLETIN OF SEPT. 19, 1879.]

Mr. Samuel Fellows has proved the efficacy of Bradley's Phosphate as a fertilizer for potatoes. This season he has raised *over six hundred bushels* on two and one-half acres of land, using nothing but Bradley's Phosphate.

POTATO CROP MORE THAN DOUBLED BY THE USE OF BRADLEY'S PHOSPHATE.

PERU, ME., Oct. 14, 1879.

BRADLEY FERTILIZER CO.:

Gents,—I find by careful experiment this season that two hundred pounds to the acre of Bradley's Phosphate has more than doubled my potato crop.

GEORGE H. DAVIS.

SIXTEEN DOLLARS' WORTH OF BARLEY FOR FOUR DOLLARS' WORTH OF PHOSPHATE.

STARKEY, N.V., June 16, 1879.

BRADLEY FERTILIZER CO.

I have used quite a quantity of your Fertilizer on my crops with paying results. I cannot afford to sow a crop without using Phosphate. Yours has given the best results of any used. I used two hundred pounds per acre on five acres of barley last season, and it produced two hundred and eighty bushels of six-rowed barley, that would weigh fifty pounds to the bushel, giving me sixteen dollars for every four dollars' worth of Phosphate.

Respectfully yours,

STOUT SMITH.

FORTY PER CENT MORE CORN ON PHOSPHATE WITHOUT MANURE THAN ON MANURE WITHOUT PHOSPHATE.

POTSDAM, N.Y., June 17, 1879.

BRADLEY FERTILIZER CO.:

Gents,—Wherever I have used your Phosphate I have received a very marked benefit on corn, potatoes, and wheat. On corn, last year, on heavy clay and loam soil, I got forty per cent more corn without any manure where I used your Phosphate than where I used manure.

Yours truly,

F. V. ELLIS.

IT PAYS FOUR HUNDRED PER CENT ON WHEAT, AND THEN INCREASES CLOVER CROP FOR TWO YEARS.

McLEAN, N.Y., Feb. 1, 1879.

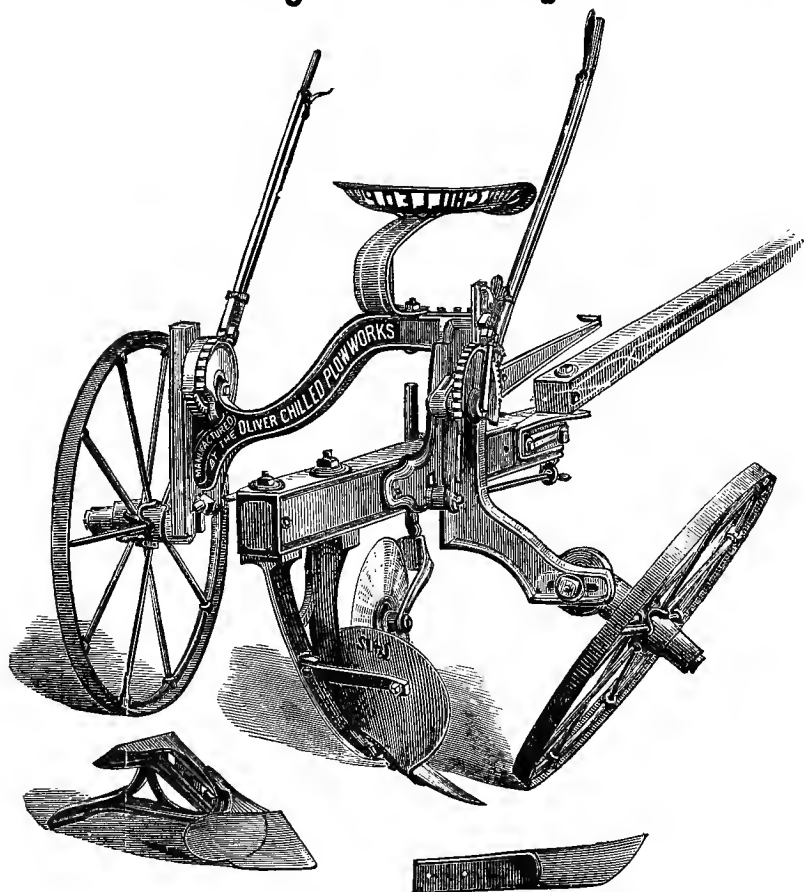
BRADLEY FERTILIZER CO.:

Gents,—I have used your Phosphate on corn where it made an increase of twenty-five bushels of corn per acre; on wheat, where it paid me four hundred per cent by actual measurement, and also made a marked difference in the clover for two years.

Yours respectfully,

ED. PER LEE.

THE
"Casaday" Sulky Plow.



No Landside. Light Draft. Easily Managed.

*More and better work with the same power
than can be done by any plow in use.*

Address, for circulars, terms, &c.,

**OLIVER CHILLED PLOW MILLS,
South Bend, Ind.**

NO ROYALTY.

THE AMERICAN SHEARER M'F'G CO.

Manufacturers of Power and Hand

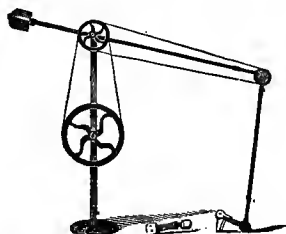
HORSE CLIPPING MACHINES,

Also the Only Reliable and Successful

SHEEP SHEARING MACHINE

That has ever been put upon the Market.

SHEEP SHEARING MACHINE.



This is the only reliable sheep shearer that has ever been thrown upon the market. It gives great satisfaction to all who have used it enough to become familiar with it.

An expert will shear ten sheep an hour, easily, as sheep are shorn in New England. Of course the question of speed in shearing involves the condition of the sheep and the experience of the shearer.

This machine is also used for shearing pelts, both fresh and dry. It cuts the wool of equal length, and if properly used never clips the wool the second time. Indeed, prominent manufacturers say that the wool is worth at least one cent a pound more if cut by this machine than it is when cut by common shears.

The Centennial Award was given us at the Philadelphia Exposition; also, awards from the "New York Institute," "New York State Fair," the "Ohio State Fair," "New Hampshire State Fair," &c.

NASHUA, NEW HAMPSHIRE, U. S. A.

P. O. BOX 578.

Also manufacturers of a fine variety of

HORSE & BARBERS' CLIPPERS.

"WINNING FARM," BILLERICA, MASS., May 24, 1880.
AMERICAN SHEARER M'F'G CO.—I am well satisfied with the working of the Sheep Shearer upon my Cotswolds and Oxfordshire Downs. We sheared one fine ewe in five minutes; weight of fleece 11 pounds. It shears them smoother and better than can be done by hand.

Yours respectfully,

JOHN M. BAILEY.

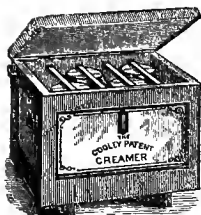
A complete line of our Goods can be seen at C. M. MOSEMAN & BROTHER, 128 Chamber St., N. Y.; B. A. EARL, 857 No. Fifth St., Philadelphia, Penn.; and L. C. CHASE & CO., Washington St., Boston, Mass.

SEND FOR OUR ILLUSTRATED CATALOGUE.

AMERICAN SHEARER MANF'G CO.

WATER ST., NASHUA, N. H.

COOLEY CREAMER.



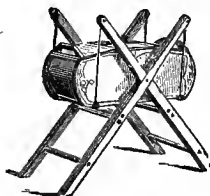
Gold Medal, Paris, 1879. Butter made by this process awarded Sweepstakes at International Dairy Fair, 1878, and *Gold Medal* and *First Premium* at the same fair, 1879; *First Premium* at Royal Agricultural Exhibition, London, 1879.

It requires no milk-room; it raises all of cream between milkings; It affords better ventilation; it requires less labor; it is more thoroughly made; it is cheaper, and gives better satisfaction than any other way of setting milk. *The Butter made by this system is unequalled in its keeping qualities.*

Over eight thousand of these Creamers are now in use, and give the best of satisfaction. The best dairymen of the country use and recommend them, including Ogden Farm, Newport, R. I., Echo Farm, Litchfield, Conn., Winning Farm, Billerica, Mass., Lawrence Farm, Groton, Mass., T. J. Cooper, Coopersburg, Penn., Hiram Smith, Sheboygan Falls, Wisconsin, Holley Grove Farm, Plainfield, N. J., and many others.

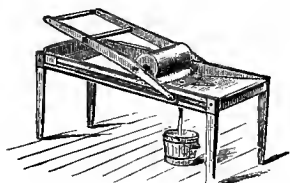
Smith, Sheboygan Falls, Wisconsin, Holley Grove Farm, Plainfield, N. J., and many others.

DAVIS SWING CHURN.



Awarded First Premium over all competitors at only practical test ever held at International Dairy Fair. The box contains no floats or inside gear, which mash the butter-globules; no corners in which the cream can lodge to be washed into the buttermilk and lost when the butter separates. The butter gathers in beautiful granules, in the best possible condition for washing in the churn with cold water and brine. This Churn needs only to be seen to be appreciated. Is easiest to work; easiest to clean. Sales are increasing fast where they have been introduced.

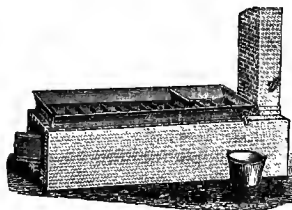
THE EUREKA BUTTER WORKER.



Highest Award at the International Dairy Fair at New York, December, 1878.

The "Eureka Worker" is so constructed that all portions of the butter are equally worked with even pressure; works faster and leaves the *grain* of butter in much better condition than the workers with corrugated rollers, and is acknowledged by the best dairymen to be superior to all others.

THE IMPROVED EVAPORATOR



Makes better Sugar than any apparatus in use, with one-half the fuel and labor.

Makes sugar that will sell several cents above that made in pans. *No sugar maker* should be without them, at the extremely *low price* at which they are now offered. These Evaporators are extensively used for evaporating Maple Sap, Cane and Sorghum Juice, and for making Jelly from Sweet Cider without sugar or any foreign matter.

ALL OF ABOVE GOODS MANUFACTURED BY THE

VERMONT FARM MACHINE CO.

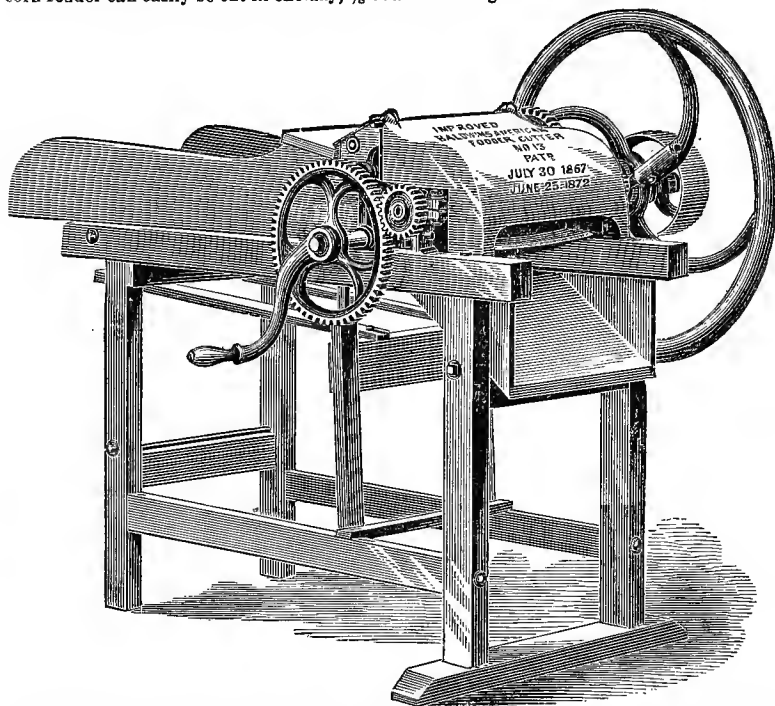
BELLOWS FALLS, VT.

Illustrated Circulars sent on application.

IMPROVED BALDWIN'S AMERICAN FODDER CUTTER.

ESPECIALLY ADAPTED FOR ENSILAGE.

With a one or two-horse tread power or a small engine to drive it, 25 to 50 tons of green corn fodder can easily be cut in one day, $\frac{3}{8}$ of an inch long.



The above cut represents our Cutter with the Safety Fly Wheel, by which perfect safety is secured to the machine while in motion, and also to the operator. In case any hard substance, such as iron, stone or bone comes in contact with the knives, being fed into the machine with the fodder when the machine is running at its highest speed, there is no danger of breaking.

In presenting our NEW IMPROVED BALDWIN'S AMERICAN FODDER CUTTER to the dealers and farmers of the country, we wish to call their attention to a few of the different points of the machine which makes it the leading and by far the best Fodder Cutter in the market.

1st. The wood work is made of the best timber, thoroughly seasoned, and bolted together so it can always be kept firm. It is not pinned together with wood pins like most Cutters in the market, which soon become loose and makes the Cutter shaky.

2d. The iron work is made of the best wrought and cast iron, the boxes in which the journals run are babbeted, thus avoiding any possibility of their wearing out; the knives are made of the best steel, thoroughly tempered.

3d. By a simple device the top feed roller is so arranged that it rises and falls according to the thickness of the fodder fed into the machine, and at the same time is kept parallel with the lower feed roller, which relieves all strain from other parts of the machine.

4th. The feeding arrangement is the simplest and best in use, having only three feed gears, while other machines in the market are a perfect mass of gears, which anyone acquainted with machinery would see at a glance would be liable to get out of order and make the Cutter run hard.

5th. Each machine cuts four lengths— $\frac{3}{8}$, $\frac{1}{2}$, 1 and $1\frac{1}{2}$ inches. The length of cut can be easily and speedily changed, and is so simple that anyone can understand it.

No. 13 has two knives 13 inches long, and is large enough for cutting for Ensilage for the majority of farms.

No. 15 has two knives 18 inches long. It is the largest Cutter we make and is especially adapted for large stables, paper mills, and for cutting green forage for Ensilage.

Manufactured for and for Sale by

JOSEPH BRECK & SONS.

Albany Corn and Seed Planters.

(See cut on opposite page.)

Awarded the Highest Medal at the Centennial, as being the Best Planter.

SAVES ITS COST IN PLANTING FIFTEEN ACRES OF CORN. One man and a horse can plant from seven to ten acres of corn in one day, with the Planter, at a cost of from \$3.50 to \$5.00.

COST TO PLANT FIFTEEN ACRES BY HAND:

Marking both ways, one man and horse, two days, at \$3.....	\$6.00
Planting, twelve men, at \$1.....	12.00
Board for ten extra men, two meals each, at 25 cents.....	5.00
Wasted, one bushel of corn.....	1.00

Total cost by hand.....\$24.00

Plant your garden with the Planter in drills, and cultivate close to the rows by horse instead of hand. Its value for this purpose alone is more than its cost.

This **PLANTER**, at one process, opens its furrow, gauges, drops, covers the seeds and rolls them down. Also measures and marks off the distance for the next row or drill to be planted.

It will plant all kinds of Seeds, from Corn, Beans, Peas, etc., to the smallest and varied forms of Garden Seeds, in Hills or Drills, at any distance between the seeds or hills from one to seventy-two inches. Also measures the Quantity of Seeds to the Hill, Drill or Acre.

Any of these changes may be made in five minutes' time to adapt it to the work required, and the seeding action may be instantly thrown out of gear and stopped, in turning at headlands, or for moving from field to field. By being careful about throwing out of and in gear, at the end of the rows, the hills may be made to row both ways.

With recent improvements in strength and workmanship, the manufacturer is enabled to offer this machine as the nearest perfect Planter extant.

There have been more than twenty thousand of these Planters made, sold and put in use, and which are giving *unqualified satisfaction*, and the demand for them is constantly increasing. It may be worked by horse or hand.

Price.....	\$20.00
" with Fertilizer or Horse Hoe.....	23.00
" with both.....	25.00

Address,

O. H. P. CORNELL, Albany, N. Y.

SELF-OPERATING SULKY RAKE. IMPROVED LION.

Best Rake Made in the World.

POINTS OF SUPERIORITY.

SIMPLICITY.—The mechanism for elevating the teeth of this rake consists simply of a double crank and two independently acting clutches.

DURABILITY.—The lifting device is sufficiently strong to withstand the severest strain, and is subjected to *no wear whatever*, except when lifting the teeth. Nor can it be injured by accidentally or otherwise throwing clutches into gear while the teeth are falling. This is an objectionable feature found in most self-dump rakes, but which is fully overcome in the construction of the **LION**.

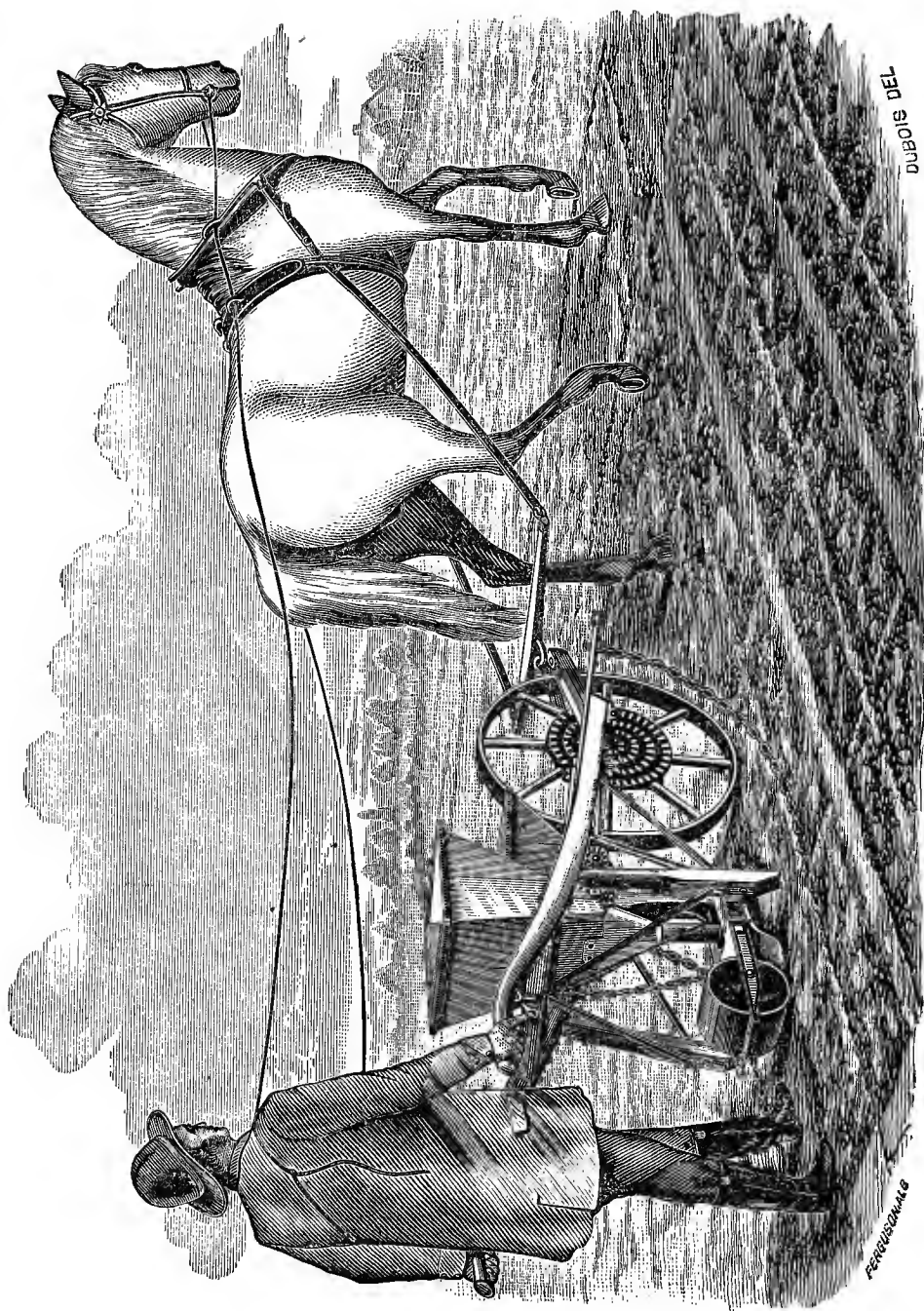
EASE AND NICETY IN OPERATING.—To discharge a gathered load, the operator has to merely put the right foot upon a conveniently placed pedal and press downwards, which locks the lifting device, thus requiring no further care from the driver, as the forward motion of the horse completes the operation.

GUARANTEE.—Every rake is guaranteed to give satisfaction if properly managed, to be made of good material and in a workmanlike manner, and to do good work in all kinds of hay and grain.

Examine our Rake before Buying.

Address,

O. H. P. CORNELL, Albany, N. Y.



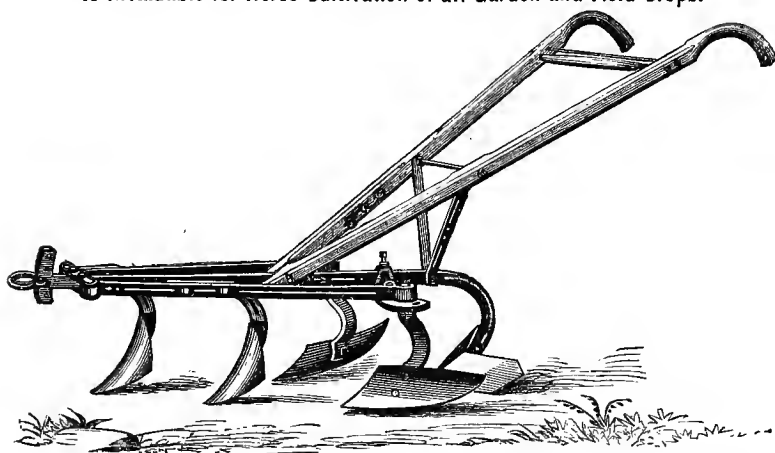
DUBOIS DEL

ALBANY CORN AND SEED PLANTER.

PERCIVAL

PLANET, JR., HORSE HOE.

Is Invaluable for Horse Cultivation of all Garden and Field Crops.



It is constructed in the most thorough manner, of the best materials, in elegant style and with extra finish. The frame and standards are of wrought iron, bolted together; the teeth are tempered and polished steel; the handles are adjustable in height and the frame in width. It has our Improved Patent Clevis, having neither loose pin nor bolt, to regulate depth, and a new stirrup clamp with the expanding irons beneath the frame, giving great strength and ease of changing width. The front teeth are reversible when worn; the side hoes turn end for end, throwing to or cutting away from the row, as desired. The tool is furnished with a wheel in front when so ordered, and two extra teeth supplied at small additional expense form an attachment which converts the tool into the celebrated "Iron Age" Cultivator. When used with wheel and an adjustable concave roller in the rear, it makes a tool which covers corn without tearing up the sod, and in the most thorough and expeditious manner possible.

**No Sugar Beet grower or Ensilagist can
afford to be without one.**

NET RETAIL PRICE LIST.

Planet, Jr., Horse Hoe, Plain,	\$9.75
" " " with wheel,	10.75
" " " with Wheel and Cultivator Attachment,	10.75
" " " complete with Wheel and Cultivator Attachment,	12.00
Corn Covering Roller with Irons Add	3.50

JOSEPH BRECK & SONS,

51, 52 and 53 North Market Street, - - - Boston.

CHEAP CORN CULTURE.

THOMAS PATENT

Smoothing Harrow and Broadcast Weeder,



WITH 48, 72 OR 96 ROUND SLANTING TEETH
OF TEMPERED STEEL.

The Frame of Carefully-Selected, Well-Seasoned White
Oak Timber, Thoroughly Painted.

Patented 1871; January 16, 1872.

FACTURERS,

T

HARROW CO.

Office and Manufactory, 241 and 243 Exchange St.,
GENEVA, N. Y.

AGENTS FOR NEW ENGLAND:

JOSEPH BRECK & SONS,

51, 52 and 53 North Market St., - - Boston, Mass.

DEAR SIR,—We respectfully commend to your notice the following extract from an editorial in the *Country Gentleman* of April 15. It is the experience of several thousand readers of that paper, who own our Harrow. This is the only implement that increases the yield of grain, besides doing the work of pulverization twice as rapidly and far more effectively. A mowing machine or a reaper gathers the crop quickly, but makes it no greater. Our Harrow will do the work of harrowing in one-half the usual time, and increase the crop 25 per cent:—

THE THOMAS SMOOTHING HARROW.

"The Slanting Tooth Harrow has already proved an important labor-saver in some departments of farming. The round, smooth teeth, slanting backwards at an angle of forty degrees, freely clear all obstructions, do not clog, pulverize manure, harrow wheat, and destroy the small weeds in corn drills. Two or three harrowings of wheat in Spring before sowing clover, have increased the yield on an average about five bushels per acre; and if used on all the 38,000,000 acres of the Union, would be worth over a hundred million dollars in the aggregate. Used on corn before it comes up, and every few days for a month afterwards, this implement clears out all starting weeds and saves three dollars an acre in hand-hoeing and cultivating. On the 50,000,000 acres of corn in the Union, it would be worth a sum of great magnitude."

We also call attention to the following from the *Rural New Yorker*, April 17, by W. I. Chamberlain, of Hudson, Summit County, Ohio, one of the staff writers of the *Rural*, himself an extensive farmer, who has used the Thomas Smoothing Harrow for eight years. It is part of a long article discussing farm machinery:—

"FIELD CULTIVATION OF 'HOED CROPS'"

should be almost exclusively *without* the hoe. In many parts of the West the large fields of corn, potatoes, broom corn, etc., never see a hoe at all. How the East may learn from the West! Corn is planted with a two-horse rower that plants twelve acres a day better than it can be done by hand. It puts the seed down two inches into damp soil, below the reach of the harrow teeth soon to follow and sure to uproot or displace ordinary surface planted corn. Potatoes are covered with a horse. Both are harrowed thoroughly several times before and after coming up. The Thomas Smoothing Harrow is best for this. Indeed it is the only implement I know that is a perfect success as a broadcast weeder and tiller of *growing crops*. It kills the young and tender weeds, if used every few days, and leaves unharmed and greatly benefitted the firmer, deeper-planted corn, potatoes, oats, wheat, etc., and it mellows the soil *in the hill* as no hoeing can."

BLAWENSBURG, N. J., Dec., 1879.

The Harrow you sent me gives entire satisfaction. *A splendid implement for cultivating corn before and after it is up.* By harrowing it both ways it will kill weeds and loosen the ground around the hill better than could be done with any other machine I know of. I also consider it invaluable for harrowing wheat in the Spring, having a very beneficial effect, doing no damage whatever, and making the *catch of clover an absolute certainty*.

Yours truly,

AUGUSTUS VAN ZANDT.

ASCUTNEYVILLE, VT., Dec. 8, 1879.

The harrow proved itself to be exactly what we wanted, and as a seed and smoothing harrow we think it cannot be excelled. We used it on ground that was so stony that one section had to be lifted frequently to allow it to pass between the stones. We were equally satisfied as to its merits *on stony as well as on smooth ground*. We earnestly recommend it to be used either on stony or smooth ground.

Yours truly,

ALLEN MURRAY, F. W. BLANCHARD.

DEERFIELD, FRANKLIN CO., MASS., Jan. 16, 1880.

I have used your Harrow for several years with perfect satisfaction. It will pay for itself every year in cultivating twenty acres of corn.

H. C. HASKELL.

We have thoroughly used your Harrow in cultivating corn and find it fully performs all you claim. For general use no harrow that we have ever seen bears any comparison to it.

WHITTEN WELLS, Bellville, Wood Co., W. Va.

S. C. GRANNIS, Clinton, Oneida Co., N. Y.

N. A. SMITH, Sunderland, Franklin Co., Mass.

J. L. PETERS, Worcester, Mass.

D. A. WHELOCK, Roslyn, Queens Co., N. Y.

J. W. RATHBORN, Utica, N. Y.

E. G. RUGGLES, Windsor, Windsor Co., Vt.

E. WISNER, Flat Rock, Crawford Co., Ill.

HIRAM ASHCROFT, Sheboygan Falls, Wis.

E. M. JEWETT, Buffalo, N. Y.

I. L. PATTERSON, Mt. Ayr, Iowa.

ROBT. M. McDONALD, Summit, Pike Co., Miss.

HENRY NICOLL, Philadelphia, Pa., 30 Pine St.

W. D. MERRELL, Prairie du Chien, Wis.

JOHN B. DEACON, Mt. Holly, Burlington Co., N. J.

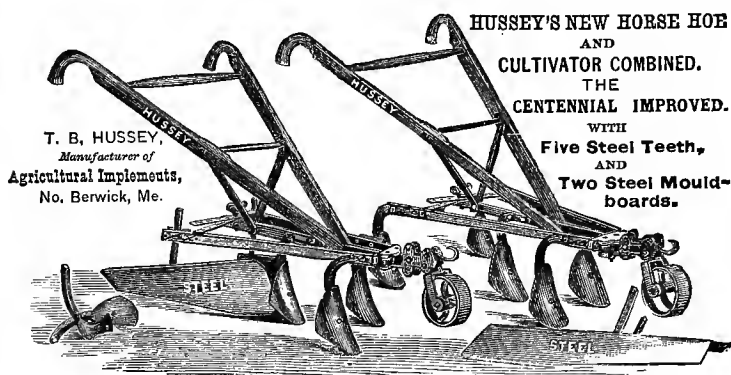
T. B. HUSSEY,

MANUFACTURER OF

PLOWS

— AND —

CULTIVATING IMPLEMENTS.



"Mr. Hussey's plows give excellent satisfaction—never hear them spoken of except by way of approval."—*Maine Democrat*.

"The pattern is very handsome, and the plow itself a specimen of excellent workmanship."—*New Hampshire Journal of Agriculture*.

"Mr. Hussey not only makes it a point to get up a first-rate plow as a whole, but also to have every piece and part of it perfect."—*Union and Journal*.

"The No. 15 plow I purchased of you last fall draws the easiest, for the work it does, of any plow I ever saw. It works beautifully, and to my entire satisfaction."
R. T. RANKIN, *Winterport, Me.*

"Since visiting the factory, we are not surprised that the Hussey Plow, evidently made with so much care and skill, has gained such an enviable reputation. We say, 'Speed the (Hussey) Plow.'"—*Aroostook Pioneer*.

"The Hussey Plows are the only ones we can sell in this section."

M. M. STACKPOLE, *West Woodstock, Conn.*

"We, the undersigned, citizens of Ipswich, Mass., are using the Hussey Plows, and would cheerfully recommend them to all in pursuit of a first-rate plow."

RANDALL ANDREWS.
L. C. PICKARD.
IRA A. CARLISLE.
THOS. SANFORD.

STOCKBRIDGE MANURES.

SEND FOR NEW PAMPHLET. MAILED FREE.

Seven years ago the Stockbridge Manures were only known to a few farmers in the Connecticut Valley. Now they are so extensively used in the Atlantic States as to require two large factories, one in Boston and one in New York, to manufacture them. This increase shows what farmers think of good fertilizers, and is not only due to the fact that they are reliable, well-made, and high-grade manures, but also to the fact that farmers have found them

PROFITABLE TO USE.

And now that corn and other farm produce is bringing good prices, such as were seldom realized during the war, considering they are now on a *gold basis*, farmers will therefore find these manures *still more profitable to use*.

ALSO, MANUFACTURERS OF

**BOWKER'S HILL
AND
DRILL PHOSPHATE.**

The Best and Cheapest Sold in New England.

ALSO FOR SALE,

Agricultural Chemicals, Ground Bone, &c.

BOWKER FERTILIZER CO.,

43 Chatham Street, Boston, or

3 Park Place, New York.

Farmers' Favorite Grain Drills,

THE PIONEER DRILL OF AMERICA,

MANUFACTURED BY

BICKFORD & HUFFMAN,

MACEDON, WAYNE COUNTY, N. Y.

THE ONLY DOUBLE DISTRIBUTER DRILL IN THE WORLD

Can Instantly and by a Single Movement be changed from a drill especially adapted to seeding the fine heavy grains to one especially adapted to sowing the coarse bulky grains.

THE BONANZA GRASS SEEDER.

The only Seeder readily adjustable to work in front or rear of tubes, with equal facility for work in either position, securing uniformity and certainty of distribution of all grass seeds, large, small, or mixed. **Has been highly commended everywhere a grand success.**


THE FERTILIZER ATTACHMENT,

never more positively than to-day maintained its conceded superiority over all other devices for this purpose. **The last year** has proved its eminent superiority over each and every competitor, readily and satisfactorily distributing Fertilizers whose composition or condition rendered their distribution impossible by any other device.


Any of the devices in use sow dry fertilizers passably well. Not a single one of its competitors have been able to either uniformly or continuously distribute, bad, damp and pasty fertilizers. WE GUARANTEE PERFECT work with this drill, distributing any variety of fertilizer on the market, and in any condition it is offered for sale by its manufacturers.

THE COMMON SENSE SPRING TUBE

may be used as a peg tube in case any part becomes demoralized, preventing its use as a spring tube. Is thoroughly practical in its operation, simple in its construction, possessing all the endurance and wearing quality of the Pin or Peg Tube. Using no gum or rubber in its construction, it is impervious to weather or exposure, and, if accidentally broken, can be repaired at your homes, saving the cost of transportation and delay.

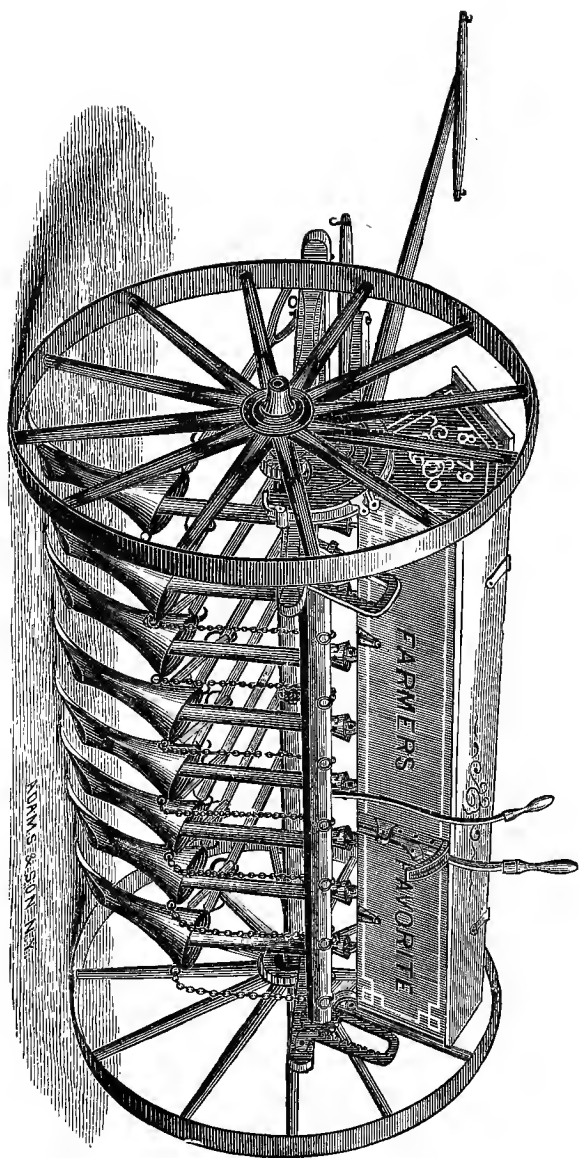
 All these Drills are furnished with Neck Yoke, Whiffletrees, Land Measurer and the **Davis Patent Tube Shifter**, for which an extra charge is made on all other Drills using it.

The Superior Manufacture and finish of these Drills are too well known to require mention here.

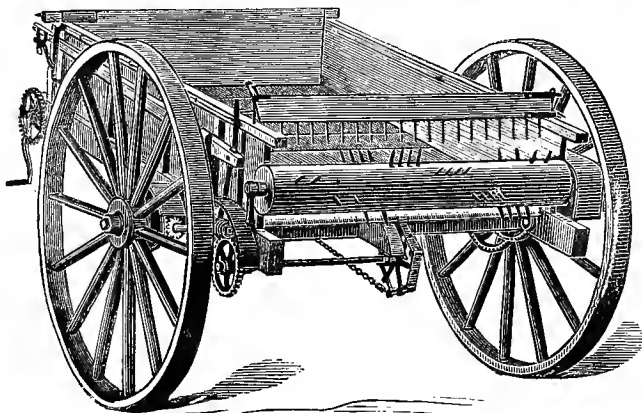
 For Descriptive Circulars, Price Lists, and any further information, address,

BICKFORD & HUFFMAN,

MACEDON, WAYNE CO., N. Y.



KEMP'S PATENT MANURE SPREADER, PULVERIZER AND CART COMBINED.



This cart is not only a *Great Labor Saving Machine*, but it does its work better than can possibly be done by hand.

This great saving of time and labor is only of secondary importance as compared with the quality of the work it does. Good judges have decided that manure spread as even and pulverized as fine as this Cart leaves it, is worth from *Twenty-five to Fifty Cents per Load* more than the ordinary way of spreading, as the young plants receive the full benefit of the manure.

It will spread all kinds of manure, whether coarse or fine, wet or dry, heavy or light.

It can be attached to the fore wheels of any *Ordinary Farm Wagon*.

Read what J. J. H. Gregory, Esq., says:—

RICHARDSON MFG. CO.:

MARBLEHEAD, MASS., April 10, 1880.

Dear Sirs,—Send to my address, Marblehead, a Manure Spreader with latest improvements. The best possible recommendation is the fact that, after using two last season I now order a third. Should they last but ten years, if I get a dozen dollars a year value out of them, they will pay for themselves. Whereas I am satisfied that I save in time necessary to spread it, and in the better manner in the spreading, with the greater value given the manure by reason of extra fineness, at least a dollar on a cord. Now as I expect to spread some hundreds of cords with said cart, you can figure the profits of the investment.

Yours truly,

J. J. H. GREGORY.

P. S.—I class it in value to the farmer squarely up with the Mowing Machine.

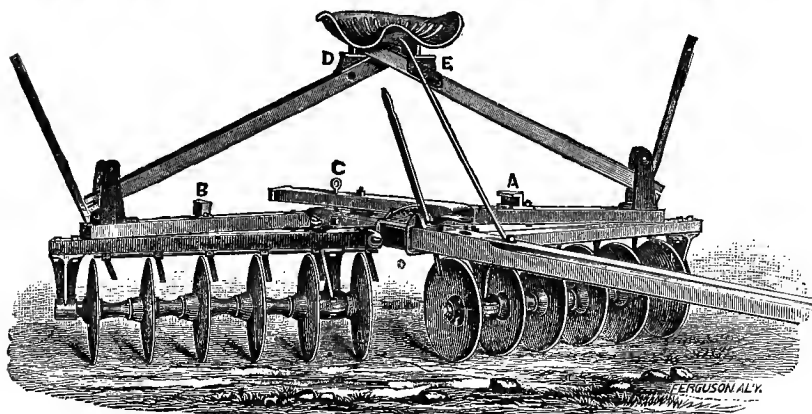
J. J. H. G.

MANUFACTURED BY THE

Richardson Manufacturing Co.

WORCESTER, MASS.

FRANK BRAMER'S NEW Randall Harrow.



Great Improvement. Ne Plus Ultra.

The Most Convenient, Effective, Durable and Reliable Harrow Made.

THE STANDARD OF COMPARISON FOR ALL OTHERS.

The Original Vertical Plate Wheel Harrow.

A Cultivator equalled by no other; economizes time, saves labor and money, secures the greatest yield of crops by the most perfect tillage.

A COMPLETE SUCCESS. OVER 30,000 IN USE.

Unrivalled for its power, incomparable rapidity and effectiveness for surface tillage of all tenacious and tough soils; is often a substitute for the plow, cutting more than six feet in breadth. It is deservedly considered to be the

MOST POPULAR AND PROFITABLE FARM IMPLEMENT IN USE.

WHAT IT WILL DO.

It will	<i>Save time, Save labor, Save money, Save seed grain.</i>	It will	<i>Increase your crops. Increase your purse. Increase your happiness, Increase the value of your land.</i>
It will	<i>Thoroughly pulverize the soil, Thoroughly cover up your seed grain, Thoroughly cover up your surface manure, Thoroughly satisfy you in every respect.</i>		

Every operation in tillage should refer directly to securing the largest crop results and to an increase in the after-value of the land. This can be done by the use of the RANDALL PULVERIZING HARROW.

MANUFACTURED BY

**THE WARRIOR MOWER COMPANY,
LITTLE FALLS, N. Y.**

ARPHAXED LOOMIS, *President.*

FRANK BRAMER, *Manager.*

Warehouse, 38 South Market St., Boston, Mass.

PEARCE'S IMPROVED
CAHOON'S PATENT
Broadcast Seed Sower.



*For Sowing Wheat, Oats, Hemp, Barley, Rye,
Buckwheat, Grass Seed, Rice, Flax, &c.*

The hand machine, at a common walking gait, sows from four to eight acres per hour. The acknowledged superiority of these machines over all others has already placed them in the front rank of labor-saving agricultural implements. A saving of four-fifths of the labor, and one-third of the seed used in hand-sowing is effected by using these machines. A person entirely unused to sowing by hand can use either machine with perfect success.

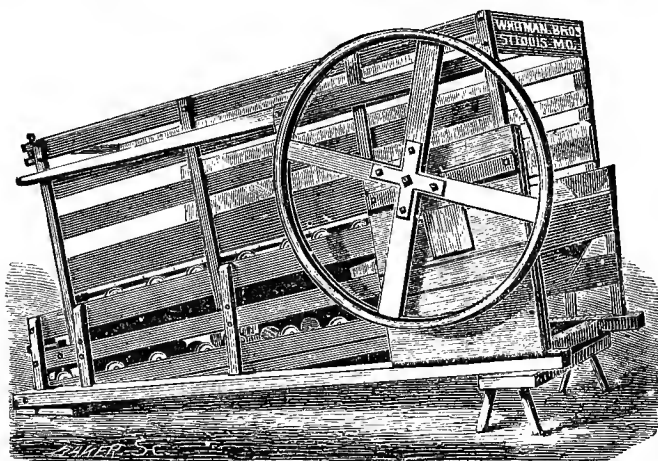
They are Warranted to give Perfect Satisfaction,

And to save their cost in less time than any other farm implement yet introduced. They are substantially built, and with ordinary care will last many years.

The Horse Power Machine, at the usual walking gait of a horse, sows from ten to fifteen acres per hour.

JOSEPH BRECK & SONS.

WHITMAN'S IMPROVED RAILWAY HORSE POWER.



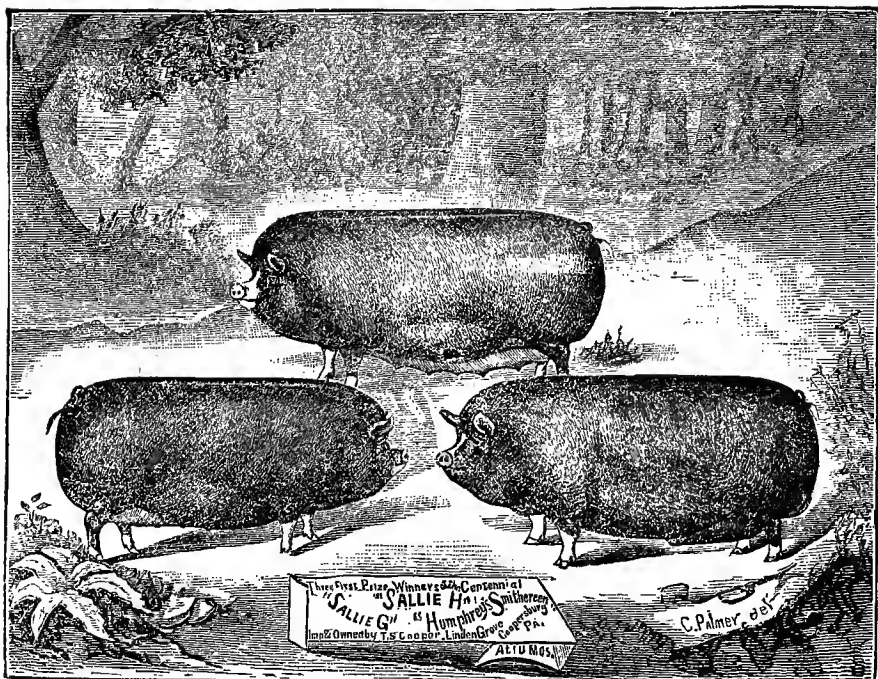
These are manufactured for one or two horses and are entirely different in construction from any other in the following points: The chain is made of wrought iron, never breaks, and when worn out any blacksmith can make a new one, while other powers are made with cast iron chain, which breaks often and cannot be repaired without new links. The gearing consists of a 24-inch gear meshing, with a pinion $6\frac{1}{2}$ inches in diameter, causing less friction and gaining more power than those using the geared chain, which are troublesome, breaking very easy and losing strength, when the lags become twisted, thereby creating friction, causing them to run very hard. The trucks are five inches in diameter, with wide face and long hub, causing them to run much easier than the small truck in general use. The hub of the trucks run against smooth iron guides instead of being confined to their axles by nuts, or running the side of the truck against a flanged railway, as are used in other powers, which must necessarily cramp the truck, causing them to bind on their axles, thereby losing power that is otherwise retained in this machine. The chain is constructed by means of a three-fourth inch rod passing through the links between the lags. The lags are ten inches in width, firmly bolted to the chain, which makes the tread very firm for horses, avoids rock or rocking motion, also the jar that is a common complaint with geared chain power and those using narrow treads.

The bridge where the horses tread is much larger in diameter than in other powers, thereby gaining much power on account of the weight being farther from the centre of the shaft. We put in a long pinion shaft, driving from either side with a six-arm wheel, instead of a four-arm as shown in the cut.

The above points, with many others we do not mention, make our power superior in durability and ease of draft, and their compactness and simplicity, lightness, great strength and width of treading-floor, are great points of excellence.

Whitman's improved Railway Horse Power is well adapted for running Ensilage cutters, and by many will be preferred to a steam engine.

JOSEPH BRECK & SONS.



T. S COOPER,

"Linden Grove," Coopersburg, Pa.

IMPORTER AND BREEDER OF

BERKSHIRE SWINE,

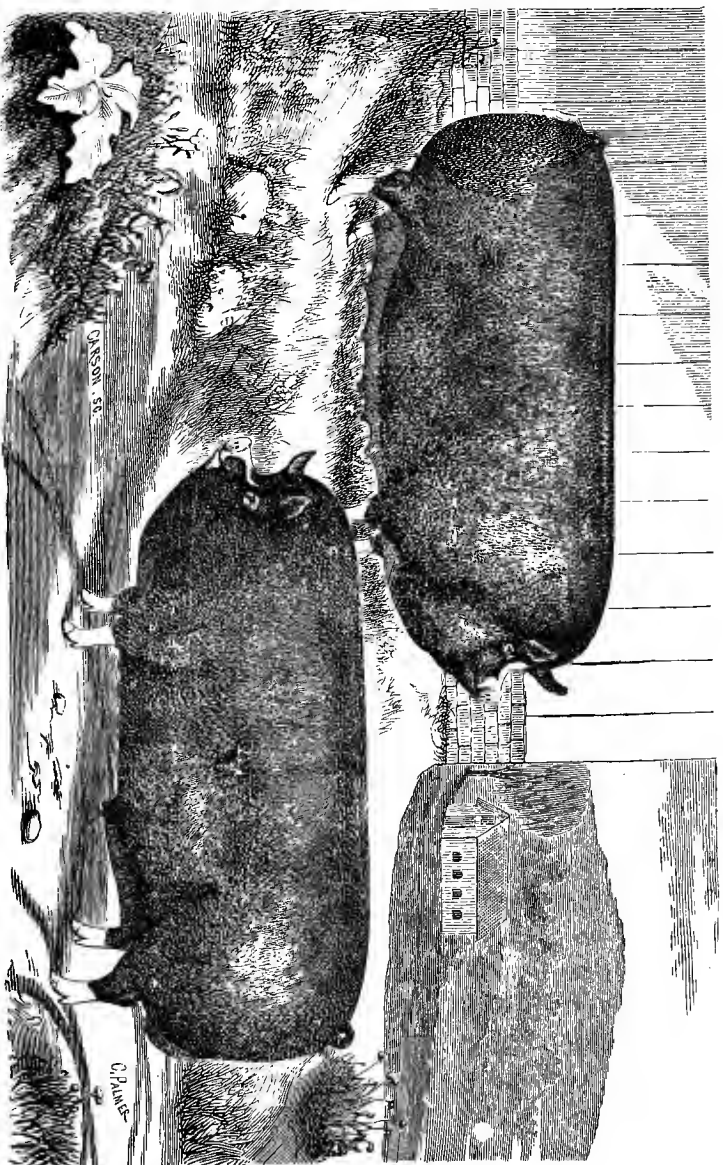
JERSEY CATTLE,

—AND—

Oxfordshire Down Sheep.

Mr. Cooper's Berkshires won the first prizes and grand sweepstakes at the Centennial.

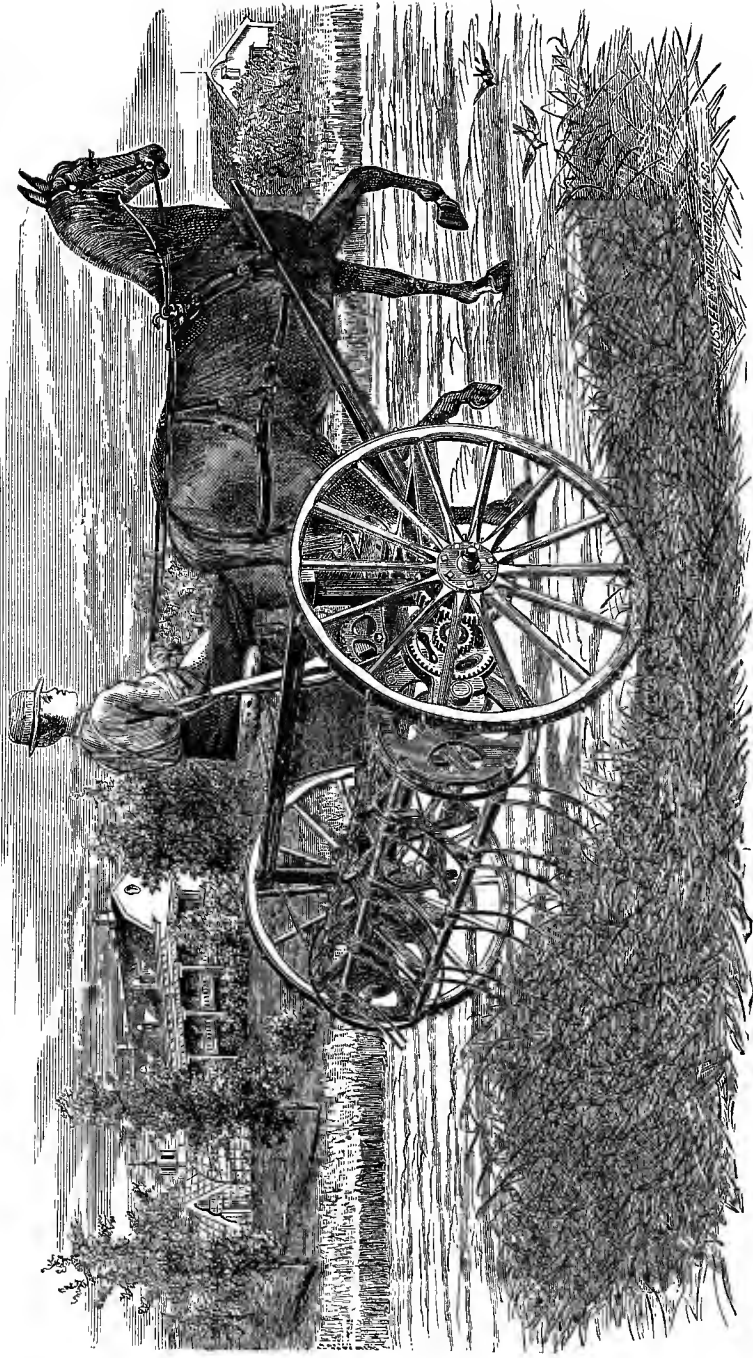
Send for Illustrated Circular.



LORD SMITHEREN and BELLADONNA,
Sweepstate Winners at the Centennial.

Imported and owned by T. S. COOPER, Linden Grove, Coopersburg, Pa.

NEW "THE AMERICAN" HAY TEDDER.



AMES PLOW CO., BOSTON, MASS., SOLE MAKERS.



Fairbanks' Standard Scales.

Absolute Accuracy, Unvarying Accuracy, Sensitive Action, Durability,

Are the necessities of a perfect Weighing Machine.

ALL THESE REQUISITES ARE TO BE FOUND ONLY IN

FAIRBANKS' **Standard Scales.**

They are made in every variety, adapted to all uses, and with

EVERY IMPROVEMENT

which the skill and experience of a half-century in the business can suggest.

MANUFACTURED ONLY BY

E. & T. FAIRBANKS & CO.

ST. JOHNSBURY, VT.

—ALSO,—

Miles' Alarm Tills, or Safety Money Drawers,
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